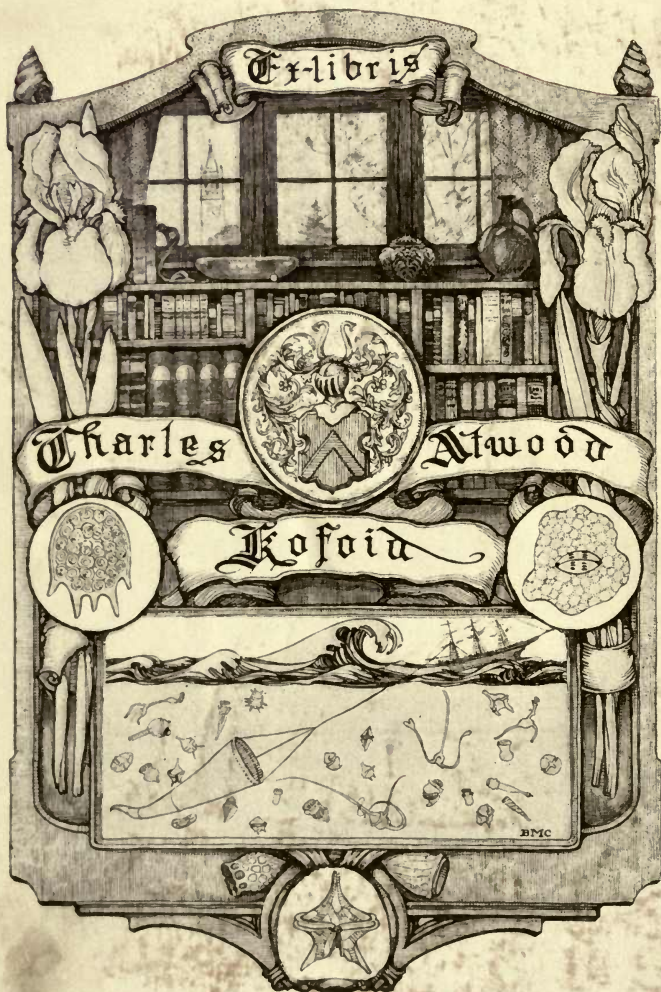


EPISODES
OF
INSECT
LIFE







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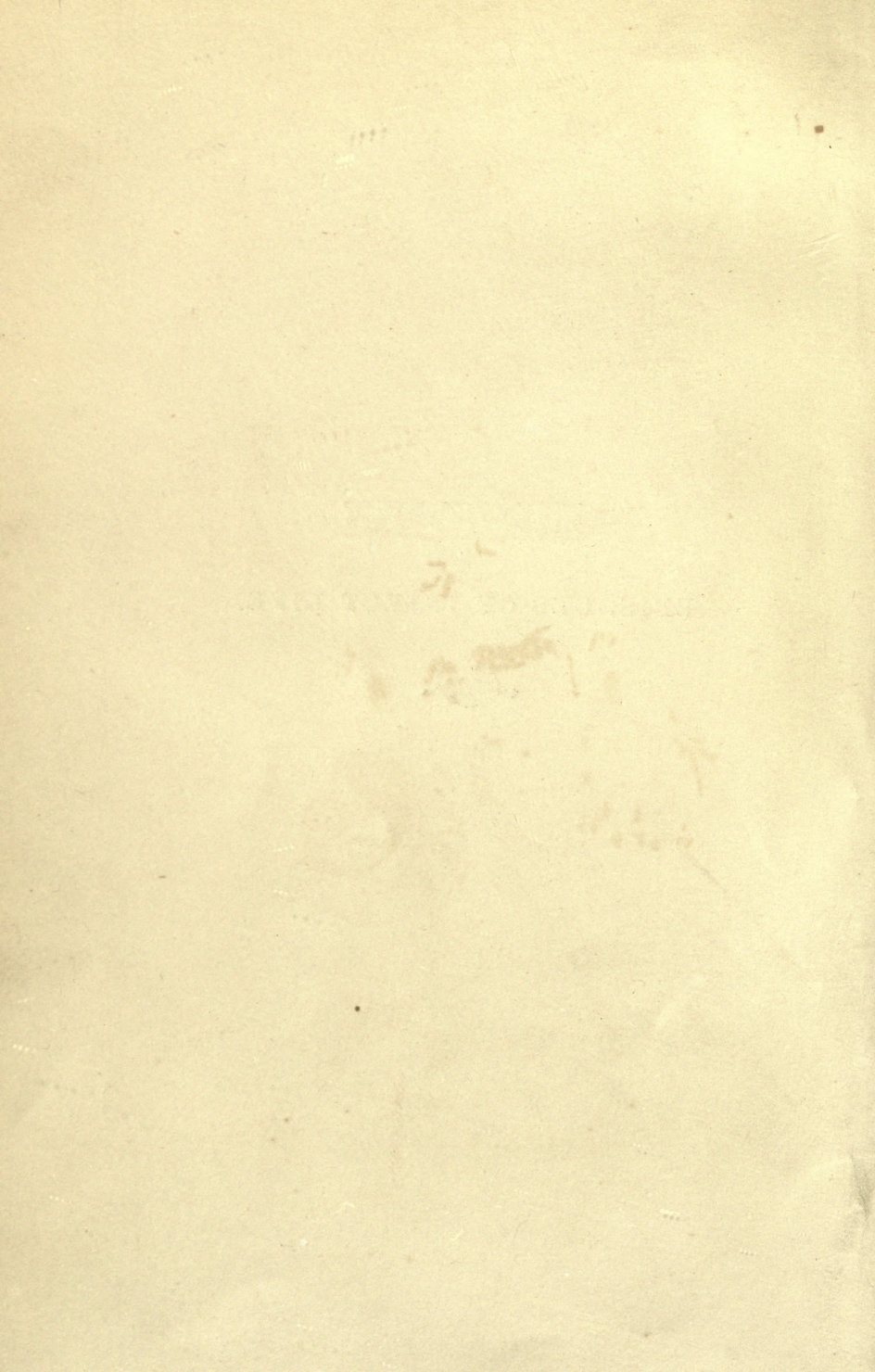
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EPISODES OF INSECT LIFE.





Budgen, Miss L. M.

EPISODES

OF



NSECT



IFE.

BY ACHETA DOMESTICA, M.E.S.

EDITED AND REVISED

BY THE REV. J. G. WOOD, M.A., F.L.S.



"So issue forth the Seasons" — Spencer.

LONDON:

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PREFACE.



THE Editor hopes that this abridged form of "Episodes of Insect Life" retains all the beauties of the original edition, while it is freed from the repetitions, and other defects, which resulted from the manner in which the original volumes were successively produced.

The reader's attention is specially directed to the illustrations, which represent insects and scenes in their life. The minuteness with which the artist has reproduced every characteristic detail is truly admirable; and even in small insects, which are drawn of their natural size, the artist has been equally conscientious, not neglecting a single joint of the antennæ, nor each claw of the tiny foot. Most of the drawings must be examined, as the insect itself must be viewed, with the aid of a magnifying

5845775

glass; and not until this is done, will the singular truthfulness of their execution be seen.

The letterpress is a mixture of scientific facts with fanciful invention, sometimes investing insects with human attributes, and sometimes placing mankind on a level with the insect. In all cases the object of the writer has been twofold: firstly, to display graphically the salient points in insect life, and secondly, to promote a kindly feeling towards insects.

J. G. W.





CONTENTS AND DESCRIPTION OF VIGNETTES.

FRONTISPIECE.

MOTHS IN GENERAL.

A group of Moths—agents and emblems of decay—holding their twilight or nocturnal revels amidst the ruins of a noble structure, of the transition period from early English to the decorated style,—the work of man.

The large descending flier in the centre of the window is the Hawk-Moth "Death's Head" (*Acherontia Atropos*); beneath it, to the left, the delicately pencilled "Puss" (*Cerura vinula*); that to the right, still lower, the Red Underwing (*Catacola nupta*). Following upwards the framework of the window, from its lower right hand corner, we come first to the Goat-Moth (*Cossus ligniperda*), in downward flight; above, distinguished by its eyed or ocellated pinions, ascends the "Emperor" (*Saturnia pavonia*); higher, and next in order, rises the little "Bark Clothes-Moth" (*Tinea corticella*); and above, within the point of the arch, the particoloured "Magpie" (*Abraxas grossulariata*). Within the point of the left-hand arch of the window is the angular-winged "Swallow-tail" (*Oura-ptyx sambucaria*). On the same side, descending with the frame, we meet next with the "Buff-tip" (*Pygæa Bucephala*); below, resting on the stonework, the "Herald" (*Scoliopteryx libatrix*); and, rising from the left-hand corner, the large, dark-winged "Hawk of the Convolvulus" (*Sphinx Convolvuli*). The two moths of greatly differing size, within the highest compartment of the window, are an "Angleshades" (*Phlogophora lucipara*), and a little "Clearwing" (*Egeria tipuliformis*).

All the Moths in the above engraving are drawn half the size of nature. Most of them, as perfect insects, are described in the episode called "Moths as Idlers," p. 272; and some, in their preparatory stages are referred to in "Moths as Destructives," p. 104, and in "Moths as Operatives," p. 239; also, in "The Tribes of an Oak," p. 173.

TITLE-VIGNETTE.

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"So issue forth the Seasons."—First we have WINTER in his merriest mood, represented by the Cricket, bedecked with Christmas holly, and alive with fun and jollity. By his right hand he holds the Brimstone Butterfly, emblem of SPRING, primrose of papilions in habits and in hue. Beneath, the jocund Grasshopper, linked to the above by a vernal wreath, figures the bright SUMMER, and in the glowing Peacock Butterfly, rich in her velvet train as the autumnal flowers she frequents, we welcome AUTUMN, bearing the ripe sheaf, and presenting her merry associate with the fruit of the vine.

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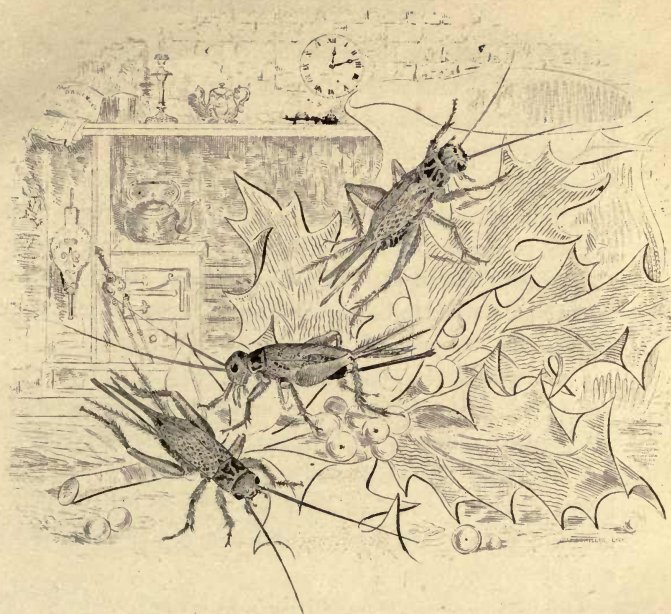
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The House Cricket, *Acheta domestica*, gaining access to the milk-jug by a sprig of holly.

THE CRICKET. INTRODUCTORY.



N eminent French Entomologist, Réaumur, has very justly observed, that "it is certainly no fault of Nature's if we do not possess works upon Insects which *everybody* may read with pleasure."—His most amusing, though rather voluminous publication, 'Mémoires pour servir à l'Histoire des Insectes,' 1734, went far to supply, in his time, the deficiency at which he hints, and in ours, amidst the multitude of familiar books on every subject, it might certainly be supposed that there is no lack of such as would suit and please everybody on this.

No inquisitive mind need complain of any want of keys for the simple opening of that drawer in Nature's cabinet (a drawer

of gems) which has been labelled "Entomology." Of these there are an abundance,—gilded keys of popular, as well as iron keys of scientific manufacture, but the still prevailing want is an incitement to place them in the lock. The works of Kirby and Spence, Rennie and Jardine, Burmeister and Westwood, may be said to furnish, pre-eminently, the gilded, or, with reference to their intrinsic worth, the *golden* keys in question; but seeing how generally even these are left to tarnish on the shelf, something would seem to be required as an incentive to their more frequent handling.

The most prevalent feeling about Insects, except, perhaps, the "busy people" of the hive or the "painted populace" of the garden, is that of indifference, if not distaste; and who of the multitude thus ignorantly prepossessed, would seek for books strictly devoted to their history, or believe that they could find interest in the mere relation of their instincts, however pleasantly detailed?

The first anxiety of a writer is, as all the world knows, to establish a kindly sympathy between himself and his readers; but how can this be speedily created betwixt one who, as an Entomologist, would seem to think of nothing but Insects, and "the many" who have always regarded them as below a passing thought? With even a slight knowledge, once acquired, of their wondrous ways, the latter will be induced to a confession that these "Minims of Creation" are *something*, even in themselves; but it may be well, meanwhile, for him who would bring them into general notice, to invest them with the charm of adventitious interest and reflected consequence. Insects are peculiarly capable of being thus treated; for in their analogies and correspondences, illustrative and emblematic, innumerable are their relations with other things, from the most trifling objects of the world we live in, up to the highest subjects of human contemplation. Multiplied then, and still multiplying, as are books on Entomology, we venture to think there is yet scope and use for one of a character more discursive, a book

not professing to teach the science, but to persuade to its study those who may have time and opportunity for the pursuit ; and to show those who have not, that they may, nevertheless, find interest and pleasure in common observation (not commonly exercised) of the insect million by which they are surrounded. With a confidence that some such work might be generally read, though by no means equally assured of our ability to write one, we long had wavering thoughts of making the attempt. At last we resolved to try, reminded by a returning epoch (a brush, *en passant*, from the wing of time) that while we doubt and linger,

“ La vie à différer se passe.”

The end of the year was at hand : “ To-morrow,” said we to ourselves, “ we will really begin a work for everybody about Insects. This very evening shall be devoted to a final decision on its plan ;” for under a hundred Protean forms, and almost as many different names, had our intended work been floating for months before our “ mind’s eye.” Letters—Sketches—Conversations, these were familiar shapes into which our materials might be moulded ; but they seemed, in one sense, too familiar ; the public taste might be tired of these hackneyed modes of dressing up the sister sciences. Besides, clothing such as this, however light, would overmuch confine us in the very discursive rambles which we had thoughts of taking amongst our creepers, and fliers, and swimmers. Episodes might better serve our purpose, and impose fewer shackles on our roving fancy : Episodes, then, they shall be called—Episodes of Insect Life, providing every month a seasonable admixture of the Real and the Ideal. But to-morrow, and for a month to come, what insects will be in season ? Of all the summer myriads, the bulk have long ago expired ; the remnant, scared even by the shadow of advancing winter, betook themselves to hidden places ; and now old Christmas has benumbed them with his icy paw, and keeps them unconscious prisoners within the earth or waters.

We may still discourse, it is true, of torpid Bees, of sleeping

Ants, of buried Beetles, and a forlorn few of widowed Wasps, stupified by grief or cold, sole relics of their perished race; but what a drowsy doleful prelude would this be to the cheerful airs we would draw from the harp of nature. These insect sleepers would furnish us with themes of life in death, for in all of them, under forms of death, forms of vitality, arrested or unexpanded, lie hidden; as in all real deaths, merely natural, are contained the germs of life. Even this departing year does not wholly die, since being full fraught with causes (seeds which are sure to ripen into the fruit of consequences), in these it will continue to live to the end of time, aye, even to eternity; but believe, and philosophize, and hope as we may, neither death nor death's semblances are the most enlivening objects of contemplation. At all events, we felt our spirits growing flat and our thoughts confused, as we looked at our waning candle (like the year, approaching to its end), and reviewed the subjects, defunct or drowsy, from amongst which we must, perforce, choose one for that of our opening essay. Dreaminess trod on the heels of dullness, and before we had come to a decision as to what sleeping insect should constitute our commencing theme, we were ourselves nodding beside our solitary fire.

Suddenly we were awake by a clang of bells from the neighbouring steeple of our parish-church, the requiem of the departed, and salutation to the new-born year. It was soon pealed out, and we were left once more to the silence of our little parlour, a silence which seemed deeper than usual, and more solemn, yet not to the spirit's ear unbroken; for it is in pauses such as these on life's rattling road, that the "still small voice" is always audible, unless it be drowned, as is common, by the noise of social mirth. We sank into a reverie, regretful more than hopeful, of retrospect rather than of prospect, and in the current of mingled thoughts that rushed over it, our lately ruling and uppermost idea (that of our contemplated book) was completely overwhelmed. Of a sudden, however, it was

again brought to the surface: a shrill sound broke upon the stillness; another chorus, within the house, succeeded to the hushed peal without. The Crickets, from the kitchen below, were uplifting their chirping strains to salute, in full concert, the new-come year. We were at no loss, now, for at least one cheerful subject wherewith to commence our Episodes.— Bless their merry voices for the opportune suggestion! Forthwith, we took up, not our pen but our candle, and descended to the lower regions, of which we found our chirpers left in sole possession. The noisy varlets broke off, instantler, in their song, and, each to his hole or cranny, scampered off at our approach; but we captured a straggler in the very act of draining the milk-pot, and carried him off to our parlour fire-side for the cultivation of a more intimate acquaintance, and with a view to making him as well known to our readers, by sight, as he, or rather his merry fraternity are likely to be already by sound. Finish thy song there, little Master! and, “with what appetite thou mayest,” thy supper too! said we, as we placed our lean lank-bodied prisoner beneath a tumbler, under which we were so merciful as to insert a few crumbs of bread, one of the Cricket’s favourite repasts. Aye, leap as thou wilt, and climb against gravity up the smooth walls of thy crystal prison, there thou shalt abide till we have taken thy portrait. Yes, queer creature as thou art! thy angular figure and round physiognomy shall be exhibited in our first vignette. Thou shalt be honoured as our opening subject, and if thy name had not served already the purpose of one, whose sympathy with thy merry chirrup has been shared by thousands, thou shouldst have given a title to our book, like “The Bee” and other seekers and gatherers of Sweets! Thou art, in truth, an omnium-gatherer, nothing comes amiss to thy convenient appetite, and variety must be the character of the feast we would provide, no less than of that which thou lovest to devour. True, as we have said, thou art not particular, “scummings of pots, sweepings, bread, yeast, flesh and fat of broth,”

thy pickings most esteemed, seem not, some of them, the most inviting fare; yet do these dainties, each in its kind, serve to symbolize, not unaptly, the very sort of viands we would seek and set before our readers.

For “scummings of pots,” suppose we say the “cream of our subject,” the most light, and, withal, the richest of the agreeable matter already laid up by others, to be extracted by ourselves in the field of observation. For “sweepings” let us put “gleanings,”—Gleanings in Entomology—and we have the very term adopted by a well-known writer for his amusing anecdotes in various branches of Natural History. Then “bread,” with Cricket as with man, the very “staff of life,” if poverty forbid him not to grasp it, what substance more properly symbolic of that which must form the ground-work of our book,—matters of solid fact, mixed with and lightened by the “yeast” of illustration, discursive and pictorial. As for the “flesh” and “fat,” the strongest fare on which the Cricket delighteth to regale, may they not serve to typify that principle of mental nourishment, of all the most vital, afforded by the religious contemplation of all natural objects endowed with life?

The Cricket is the thirstiest of all thirsty creatures. He is *not* therefore

“the *blither* for the drouth,”

for where no ampler supply of liquid is at hand, he is said (heed it, ye careful housewives!) to gnaw holes in wet woollen stockings or flannel, hung by the fire to dry. Therein, also, (though in more harmless fashion), we would make him our representative, as, thirsting after knowledge of our subject, we strive to extract from it, even when seemingly most arid, a something of refreshing moisture.

Lastly, in all his doings, our Cricket is, confessedly, a pilferer, and taking, as we largely must, from stores collected by the labours and observations of others, we shall herein, also,

resemble our prototype, except that we rob in open daylight and thankfully acknowledge what we appropriate. There are yet other points of resemblance, more personal, between ourselves and the house Cricket. As with him, a warm hearth in winter and a sunny bank in summer are the seats of our supreme felicity. Like him, also, we joy in the possession of a quiet retreat, and prefer to uplift our voice from behind a screen.

We have now set forth quite as much of our design, and revealed as much of our personality as has become connected with our immediate subject, and from the scattered grains of intimation already dropt, some prying reader may even now have gleaned more about the Cricket's ways and whereabouts than we have thought it expedient to reveal. Something more of them may be disclosed hereafter. Meanwhile, surmise what thou wilt, good gossip ! but, above all, we entreat thee to bear in mind that, alike in our proper and our emblematic character, we most heartily rejoice in all that warms and all that cheers.



"Episodes, then, they shall be called"



The Cricket mounted on the back of a magnified May-Fly, *Ephemera vulgata*, in search of entomological subjects.

THE POINTS OF OUR HOBBY.

WHAT have we here? A May-Fly in January! A magnified May-Fly! Verily, Master Cricket, thou dost not only magnify, but most unseasonably misplace the objects of Creation,—strangely, too, dost thou misapply them,—for in seating thy domestic self upon the back of this ephemeral high-flier, we are quite at a loss to guess thy meaning.—Then, gentle reader, guess not at all, only have patience, and all seeming incongruities shall be reconciled. Suffice it, now, that as in the Cricket we have introduced thee to our symbolic self, so in the May-Fly we would beg thee to recognize our symbolic hobby.

Dear Entomology! We have called thee our hobby, we have likened thee to a hack; but thou art more. Thou art a powerful Genie, a light-winged Fairy, not merely bearing us through earth, and sky, and water, but peopling every scene in every element with new and living forms, before invisible. For us, Nature has now no desert places: touched by thy magic wand, every tree has become a peopled city, teeming with busy multitudes; every flower, a pavilion, hung with gorgeous tapestry, for the summer occupation of Insect nobles, clad in velvet, gauze, or coat of mail; nay, the very moss that grows upon the tree or clothes the stone, has become to us a forest, where, as in forests of larger growth, roam the fierce and the gentle, preying or preyed on by each other; and the stone, we have only to upturn it, and we are certain almost to discover beneath, some hidden lurker, or some wondrous subterranean structure, perhaps a solitary dwelling, perhaps a nursery, perhaps a general home of refuge. Yes, our darling pursuit, of all most lightsome and life-giving, with thee for our companion, the bare, the barren, the desolate, and the death-like become instinct with life. The arid heath, the decaying tree, the mouldering wall are converted at once into fertile fields of interest and inquiry, while the summer skies and glittering waters grow brighter yet with glancing wings and oar-like feet; and with the knowledge that both are plied by a multitude of happy creatures.

Entomology signifies the study of Insects, from whose peculiar formation the term owes its origin; the bodies of this part of the Animal Creation being *insected*, or divided into three principal parts, head, trunk, and abdomen, besides other subdivisions. For this reason, the Latin name *Insecta*, Greek *Ἔντομα*, from whence Entomology.

Now of these little insected animals, thus curiously divided from the rest of animated nature (except the *Crustacea*, once also classed as Insects), many great men of antiquity, philosophers as well as poets, thought no scorn. Among these,

Aristotle, Pliny, and Virgil wrote of them largely, though, indeed, somewhat erroneously; the former, with other similar fables, asserting not only that flies were meat-engendered (a notion still ignorantly entertained), but that they also inherited a disposition, fierce or harmless, according to that of their flesh-fathers, when in life. Quite as absurdly, though more poetically, Virgil says or sings of Bees that

“ From herbs and fragrant flowers
They call their young.”

With these and similarly confused notions about the origin of Insects and other created beings, their beauties and wonders had, certainly, much less claim upon the notice of the ancients than on ours, who have acknowledged them for the work of one Divine Hand, and regarded them as visible tokens of that Divine Mind of which they are thus permitted to afford us a partial revelation; but since with incentives comparatively slight, the study of nature in general, and of Insects in particular, was yet deemed by enlightened heathens worthy of infinite attention, is it not strange that the classic robe which has so often lent a dignity to a host of insignificancies, should not at least have defended poor Entomology from neglect or ridicule? Yet so it has not been.

On the revival of general learning, there appeared in Europe a few works in which Insects were noticed among other objects of natural history; but it was not, we believe, till the reign of Charles the First that they obtained in England the honour of a whole Latin book to themselves, and were introduced to the learned public in Mouffet's *Theatrum Insectorum*.

An English translation¹ followed, and a curious old book it is, giving a complete view of all that was then known on the subject of Insects, with much information since confirmed, and with it an infinitely larger portion of gravely and quaintly affirmed nonsense, perhaps not the least amusing

¹ Theatre of Insects, Mazerne.

part of the production. It is amply adorned with figures, many of them amusing too, from their very imperfection. Some of the greatest men are, perhaps, to be found among those who pursue little objects,—those, we mean, held as little in general estimation; such people are great in their discernment to discover the real worth of what is commonly despised, and they are greater still in their independence of spirit to follow up objects whose pursuit exposes them to ridicule, and whose attainment is little likely to bring them admiration or repute. Well, in the 17th century, several gifted individuals, in this sense very great, appeared and took neglected Entomology by the hand. Chief among these were the English Ray and the Dutch Swammerdam. Insects were then found capable of exciting enthusiastic energy, incomparable patience, and fervent piety. “Oh,” says Swammerdam, while studying for his work on the habits and structure of Bees, “Oh, for one year of continued light and heat, that I might work without interruption!” Such was his enthusiasm. In his admirable dissection of Insect anatomy he has left a record of his perseverance, equalled, however, by Boerhaave, who could employ a whole day in clearing one Caterpillar from its fat, and by Lyonnet, who counted 1804 aerial tubes in the body of another, whose structure formed the chief study of his life; and for piety, that of Swammerdam finds ardent expression in the following apostrophe, drawn forth by the wonder and beauty of those divine mechanisms which patience had laid open to his own and others’ observation:—“Oh God!” he exclaims, “how Thy works infinitely surpass the reach of our feeble understandings; all that we actually know of Thee, or ever can, is but a faint and lifeless shadow of Thy adorable perfections, in contemplation of which the brightest understandings grow bewildered!” With the same feelings, inspired by similar objects, our venerable Ray composed his work called “The Wisdom of God manifested in the Works of Creation.” And again, it was the interest excited by

Insect forms, their singularity and surpassing beauty, which, in the same era, inspired the artistic pencil of a Merian, and induced her, with a woman's energy, to cross the seas, and brave the noxious climate of Surinam, for the sake of its curious and splendid Insects. These she has as truthfully depicted; ¹ though misled, perhaps, by her own enthusiasm into a too ready credence of the marvellous, the accuracy of her accompanying descriptions has been more than questioned. Thus in the latter end of the 17th and beginning of the 18th centuries, a few among the most highly endowed with talent, learning, and piety, considered the study of Entomology not unworthy to constitute the grand pursuit of life; yet, at this very period, in such low estimation was it generally held, nay, so extravagant or childish was it deemed, that we are told by Kirby of an attempt to set aside the will of a rational woman (Lady Glanville) on the ground of lunacy, evinced solely by her fondness for collecting Insects. Ray himself had to appear as a witness of her sanity. How was it that his own escaped impeachment? For all this, and calmly smiling at the scoffs of the vulgar ignorant and vulgar learned, Entomology marched on steadily, supported by a phalanx of staunch professors, such as Réaumur (called the French Pliny), Lyonnet, Bonnet, Gould, the historian of English Ants, the Swede, Baron de Geer, and at the head of all, his illustrious countryman, Linnæus.

From the glow-worm light in which it had so long glimmered, Entomology now shone, as it were, in the radiance of a swarm of Fire-flies. Yet this, her augmented brightness, did but serve for a season to make her a more conspicuous butt for the shafts of ridicule; and many a quill was shot, in derision, at this persecuted science, which could only have been aimed with any show of fairness at her merest classifiers and collectors, such as every branch of Natural History may number among the lesser minded of its votaries. But even

¹ Insects of Surinam.

persons like these, who would seem in the words of the satirist to

“ Think their eyes
And reason given them, but to study flies,”

may still perhaps be followers of objects not a whit less insignificant than those which occupy their neighbours; only that the pursuits of the many escape ridicule, because they are sought along the high-ways instead of the bye-ways of wasted life. But the laugh at Entomology is nearly spent. Known professors of the science, and members of its “ Society,” may now assemble in council and communicate their observations and inquiries without fear of becoming themselves subjects for a commission *De lunatico inquirendo*, and Butterfly-hunters, net in hand, may now chase their game without being themselves made game of. In recent times, the works of Latreille, Lamarck, Cuvier, Curtis, Leach, Macleay, with many more, have been gradually improving the science which their names adorn, while Kirby and Spence,¹ Rennie,² Jardine,³ Knapp,⁴ Burmeister,⁵ and Westwood,⁶ have published their researches to the multitude in works, which, were they as popular as they should be, would have a place not only in every library, but in every body’s hand, to serve literally as hand-books in their country rambles.

Return we now to the great volume on which the above are but imperfect commentaries!—that volume, bound in ethereal blue, and at this our chosen chapter, printed in living characters on leaves of every tint from vernal green to the richest hues of autumn; nay, on the brown or snow-white sheet of winter, for at no season is the student of Entomology presented with an entire blank. Even in the month of January, besides our chirping representative of the hearth and certain

¹ Introduction to Entomology.

² Insect Transformations, Architecture, and Miscellanies.

³ Naturalist’s Library: Beetles and Butterflies.

⁴ Journal of a Naturalist.

⁵ Manual of Entomology.

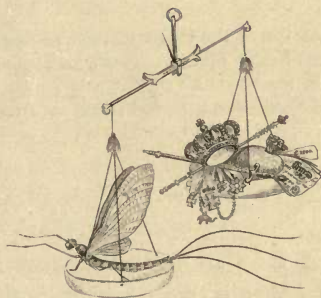
⁶ Introduction to the Classification of Insects.

Gnats which disport over frozen pools, a sprinkling of other Insects may be seen melting their frosted fluids in the wintry sunbeam or the sheltered window. Numerous others, hidden from all but practised eyes, are laid up snugly in various hybernacula of which the discovery adds a zest to their pursuit. Of these, some are concealed in caverns under ground, some in beds of mud beneath the water, some are ensconced in hollow trees, and behind or in crannies of their bark, while others lurk within the tunnels of dry perforated stalks, sleep within the domes of protecting gall-nuts, or lie defended from frost and famine in other homes of shelter, such as the care of Him who careth for all has led them so seek out.

Using our hobby as a hunter, we may pursue our game for two different objects; that of observation or collection, or both combined. And we may collect for two different purposes; that of scrutinizing living instincts, or arranging and looking at dead objects. As for him whose delight in natural objects, of what kind soever, consists solely in their amassment, or is circumscribed within the walls of his cabinet, he is no naturalist at all, a mere kindred spirit of the Bibliomaniac, and little better than the miser whose iron heart is in his iron chest. Neither are specimens necessary to the study of Insects, though, like the Hortus Siccus of the botanist, they are of great assistance, especially at its commencement. Subsequently, if you should desire to collect, we would recommend the pursuit, for this purpose, of one selected tribe; say, Beetles, as the most varied and perfect, or Butterflies and Moths, as the most elegant and interesting of the Insect classes. The study of the latter only, in the search after Caterpillars, the feeding them on fresh leaves of such plants as they frequent, and the opportunities thus afforded of watching them through their changes, transformations, and most ingenious labours, will afford ample occupation and amusement for nearly every season of the year, and moreover present us, if we choose, a collection of cabinet paintings, in whose exhibition and contemplation

(always with reference to their Great Designer) we may take a laudable delight.

For Aurelians, or collectors of Moths and Butterflies, this month and the following constitute one of the great harvest seasons. Trowel in hand, they are now repairing to the leafless woods, where carefully digging a few feet around the trunks of the trees, they "disquiet and bring up" from their winter catacombs, the mummy-like aurelias of various Moths which, as Caterpillars, have fattened in summer on the foliage above. Such as are disposed to become Aurelians themselves, must have in readiness for their treasures, thus exhumed, boxes of wood or pasteboard partly filled with vegetable earth, and covered at top with gauze. The Chrysalides consigned to their earthy bed, there should be laid over them a green coverlet of moss, which, once a fortnight in winter and oftener in summer, should be steeped in water for the purpose of giving moisture to the mould beneath.



"To the end of time this will carry us"



A magnified representation of the House Fly, *Musca domestica*, crawling up a volume in the natural history library. To the left is a highly magnified figure of the foot, and in the centre are the larva and pupa of another species much resembling it, abundant in its imperfect stages between the membranes of dock leaves.

FLIES IN WINTER,—AND A FLY LEAF.



THE Flies are gone, but where are they gone to? that is the question. At the close of summer, when they are busy and buzzing around us in the shape of a visitation, it is certainly no easy matter to let them “pass by us as the idle wind;” but in one respect they are, to most people, like the wind too, since they scarce know whence they come or whither they go. Doubt the first, as to whence they come, is not difficult to solve, though perhaps with the most

presuming of Flies, as with the most presuming of folks, the more we pry into their places of birth, the more we may be inclined (but with the insect not justly) to hold them in contempt; suffice it, that as the domestic Fly makes himself quite at home in our houses, so has his parent, in all likelihood, made herself equally free of our stables, where she finds a hot-bed for her eggs, and in the same a provision for her infant race. There, in their first and wingless state of maggot or lava, they commence, thus early, their important use of helping to rid the earth of all things that offend, and on how grand a scale they are able to carry on this operation may be estimated from the fact, that a single Fly will lay no less than 177 eggs. House Flies come then chiefly from the stable, the road, and the grazing meadow; though some nearly resembling them come from other places, and exist in their earliest state on vegetable, instead of animal substances. Among these we have noticed a very common species, which finds its first "bed and board" between the upper and under skins of dock-leaves, burrowing and feeding on the pulpy flesh. From spring to autumn we may see them thus busily employed, merely by gathering and holding to the light such leaves as are to be found continually, *not* adorned by large, discoloured, transparent blotches, the outward tokens of their inward presence. These, from the above habit, may be ranked among a set of insect labourers or feeders of more classes than one, hence called Leaf-miners, some of whose winding ways we mean, by and by, to follow.

A Fly on the wing is a no less curious object than one on foot, yet when do we trouble our heads about it, except as a thing which troubles us? The most obvious wonder of its flight is its variety of direction, most usually forwards, with the back upwards, like a bird, but on occasion, backwards, with the back downwards, as when starting from the window and alighting on the ceiling.¹ Marvellous velocity is another of its charac-

¹ Mudie.

teristics. By fair comparison of sizes, what is the swiftness of a race-horse, clearing his mile a minute, to the speed of the Fly cutting through her third of the same distance in the same time?¹ And what the speed of our steaming giants, the grand puffers of the age, compared with the swiftness of our tiny buzzers, of whom a monster train, scenting their game afar, may even follow partridges and pheasants on the wings of steam in their last flight as friendly offerings? But however, with their game, the Flies themselves would be most "in keeping" on an atmospheric line, a principal agent in their flight, as well as in that of other Insects, being the air. This enters from the breathing organs of their bodies into the nerves and muscles of their wings; from which arrangement, their velocity depends, not alone on muscular power, but also on the state of the atmosphere.

Lastly, how does the Fly feed?—the "busy curious thirsty Fly" that "drinks with me," but does not "drink as I," his sole instrument for eating and drinking being his trunk or sucker, the narrow pipe, by means of which, when let down upon his dainties, he is enabled to imbibe as much as suits his capacity. This trunk might seem an instrument convenient enough when inserted into a saucer of syrup, or applied to the broken surface of an over-ripe blackberry, but we often see our sipper of sweets quite as busy on a solid lump of sugar, which we shall find on close inspection growing "small by degrees" under his attack. How, without grinders, does he accomplish the consumption of such crystal condiment? A magnifier will solve the difficulty, and show how the Fly dissolves his rock, Hannibal fashion, by a diluent, a salivary fluid passing down through the same pipe which returns the sugar melted into syrup.

The Fly is a perfect Insect (or Imago), having already passed through its two preparatory stages of transformation, those of Larva and Pupa (see vignette), corresponding to what,

¹ Kirby and Spence.

with the Butterfly, is more generally known as Caterpillar and Chrysalis; so that, like the Butterfly, when winged it grows no more.

Once more to our picture.—You know, we suppose, that the Fly has a pair of wings; but a hundred to one, if one of you out of a hundred has ever noticed that she has also a pair of winglets (or little secondary wings), and a pair of poisers, drum-stick like appendages between the main wings and the body, employed for assisting and steadying her flight. These poisers are much more conspicuous and easily observed without a magnifier in the Gnat and in the Father Longlegs, insects belonging to the same order as Flies.

Did it ever occur to you to notice the prismatic painting of a Fly's nervous pinion—the iridescent colours wherewith its glassy membrane seems overlaid? If not, only look, we pray you, in a proper light at the next of its kind you may chance to meet with, and if, as is most likely, it comes to tell you a pleasant tale of approaching spring time, we are verily sure that you will see a hundred rainbows painted on its wing.

A FLY-LEAF.

Our friend H— had the misfortune to be cast up a poet on the stream of Life, since, in this age of mechanism, it has been turned into a mill-stream. Consequently, he found himself held as a mere bubble in the froth or scum of society, and his residence accorded perfectly with such estimation. He was the highest occupant of a house in a low London neighbourhood, where, nevertheless, he was looked down upon as a nobody.

Poor H— was a worker in the tread-mill of low periodicals, wherein, for ever climbing, each weary round of the month and year left him just where he was at the beginning; but in spite of this his daily labour, he had taken hours, which should have been of rest, for independent composition. One poem, a ponderous epic, with his name on the title-page, had already been

sent abroad into the world; but it had gone forth, like its author, unfriended, ill drest, patron wanting, paper and printing paltry. Its reception was accordant; if H— had thrown a stone out of his garret window, the passing multitude (at least if it had fallen harmless as his poem) could only have trodden on or over it the same. Yet was he still sanguine and would still believe that his neglected work, stone-like, as he proudly fancied, in solid merit, might one day serve for a pedestal whereon his laurelled statue might be planted. But few are the pedestals formed of a single stone. To complete *his*, he must, he thought, lay one upon another; so lighted to his labour by the flicker of hope's torch and the flare of tallow candle, he went on working (blockhead as he was!) through many a fireless winter's night at another ponderous block of literature—a second epic poem.

It was the afternoon of a sultry first of August; "magazine day" just over, the hireling had got a respite from his daily drudgery. He had employed it on the favourite labour of his brain; but that was ended, his epic was actually completed, even to the last word of the last line of the last fair copy, which was about to be exchanged for notes and notice.

The poet wiped his pen with an air of complacency, then wiped his thin face, threw himself back in his rush-bottomed chair, and with half-closed eyes still bent upon his manuscript, his bulky embodiment of thought, indulged in a delicious reverie. For once, all conspired to encourage the poet's day-dream, when it was suddenly broken by the unlooked-for entrance of—his tea. The black kettle was placed on the red rusted hob, and a quarter of a pound of salt butter, fresh from the shop, was deposited plateless (but, mind ye, not paperless) on the table. Scarcely were his fretted nerves composed, and the stair relieved from the servant's heavy tread, when from some point unseen arose the voice of an abominable Fly. Buz—buz—buz—louder than buz was ever heard before. The poet looked towards the small window of his sky-parlour. But no Fly was there. H— next rose and examined the dark corners

of the room, and then rushed desperately to the corner cupboard, the sole lurking place left unexplored. "Buz! buz! buz!" again rose, as if in mockery at the very thought. He returned hopeless to his chair: perhaps it was fancy after all, but presently the Fly's voice rose louder still, closer than ever, to repeat "buz! buz! buz!"

The Faster at last betook himself, with what appetite he might, to his rigid loaf, his melting butter. He cuts a slice, he proceeds to unfold the printed leaf wherein the dissolving condiment lay curtained. But not alone lay that butter in its melting luxury; a ravisher had been feasting on its charms, and now, out he bounces with a buz indeed, and buz! buz!! buz!!! re-echoes round, as a burly Blue-bottle, tipsy with love and jollity, mad at escape from thralldom, or merry at discovery, bangs up and bounces again and again against the unopened half of the garret casement.

The mystery is out; yet the Poet stands aghast, fixed as in a stupor of horror and dismay. He scarcely notices the escaped offender; the buz of Blue-bottle now falls unheeded on his ear; the bouncings of Blue-bottle attract not his eye, for his eye is strained on more appalling objects,—on the printed envelope of rancid butter,—on the title-page of his first independent and avowed production,—on his own dishonoured name conspicuous in the transparency of grease! This, then, was the publicity acquired by his first great work, and there, torn from its very self, was the sibylline leaf, which had told, in the warning buz of that prophetic Fly, the coming fate of his second, his still greater work, so laboured, so exquisitely finished. Finished! it is finished, indeed, with hope, with effort! So spoke more plainly than could words the deep drawn sigh with which poor H—— resumed his seat, not, we may be sure, to taste his ill-savoured bread and butter, but only to sip his cold tea, as if to swallow down with it something of chagrin, or to sip in something of consolation.

One day, towards the end of the same August, whose first was made, as we have just commemorated, a big black-letter day in our Poet's calendar, he was called on, in the midst of his heaviness, to furnish something light, just to puff out what would else have been a slender number of the Milliner's Magazine. In the same parlour, under much such a heavy sky, before him the same sorry equipage for tea, beside him a like bit of melting butter, nothing would have been wanted, but the Fly defunct, the fly-leaf burned, the manuscript burned too, to bring back to its author's mind, had it been ever absent, that notable era when his second grand Epic was completed. There he sat, like the distressed Poet of the "Moral Painter,"—like him might have "plunged for his thought," and like him have "found no bottom there," only that to save diving, he seized the lightsome object brought vividly to remembrance, with all its heavy associations, by the scene, the hour, and the weather. In short, he caught again that villain Fly, and committed him, in the following strain, once more to paper:—

THE FLY AND THE POET.

DARK were the cares of the Poet's breast,
Grand were the thoughts of his head,
But sad thoughts and grand ones must all be repress,
For he had to write nonsense for bread.

Proud was the curl on the Poet's lip,
And big was the tear in his eye;
Scarce he saw in the inkstand his pen to dip,
But he saw on its summit a Fly.

There Blue-bottle sat, and stroked down his face
With a twirl of his head, twice or thrice,
Then says he, "Brother bard—I pity your case,
And have brought you a bit of advice.

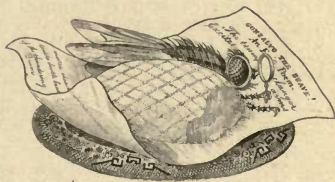
"Nay, man, never wince! I heed not your scorn,
'Tis a fact, and I'll presently show it,
That if not, as you think yourself, Poet born,
I'm by place and by feeding a Poet.

"I come from a spot where the fruit of the vine,
And the oil of the olive abound;
Where Arabia and India their riches combine,
And shed spiciest of odours around.

"High over blue mountains with snowy white tips,
I wander —, but use your own eyes,
Only look round the shop where you go for your dips,
And you'll see the Parnassus of Flies.

"And now for my council—thus rich the domain,
Whence I draw inspiration and bread;
But by lightness, not weight, I this empire maintain,
And by emptiness stand on my head.

"While others can't climb, using infinite pains,
I, gravity turning to jest,
Ascend, with all ease, perpendicular planes,
Rough or smooth, just as pleases me best.
So try *lightness*, friend Poet—I warrant you'll find
That as I rule matter, so you may rule mind!"



"Try *lightness*, friend Poet"



Transformation of the common Gnat, *Culex pipiens*, the eggs united in a boat-like form; the aquatic larva suspended, head downwards; the pupa with head upwards; and, last stage of all, the pupa with the winged gnat emerging from it.

THE GNAT.—A LIFE OF BUOYANCY.



HERE are certain temperaments which, hard as iron, are only acted on, precisely like that sturdy metal, by atmospheric changes. In dull, damp weather they gather an additional coat of rustiness or crustiness, while the finest and driest fails to produce any visible effect upon their aspect or temper. When, however, one grain of mental mercury enters into the compound, our spirits cannot choose but rise at the exhilarating influence of a bright winter's morning. Besides the effects, merely physical, of a clear bracing frost, the sunshine

of January, if it warms us less, cheers us more than the sunshine of June, through the force of contrast—contrast with the gloom which has gone before, and is sure to come after—contrast with the dark wintry objects on which it shines; and perhaps, more than all, contrast with that peculiar stillness which usually attends fair weather at this season, a stillness perceptible both to eye and ear, and produced, partly by the quiet of the tuneful groves, but quite as much by the absence of those insect myriads which animate the summer beam. This very stillness is exciting, because (our ideas of light and life being always associate) it seems, on a bright day, strange and almost unnatural. Through a silent sunshine of this description, we repaired yesterday morning to an oak wood, which is one of our favourite places of resort and research. This wood, till lately, was a sylvan assemblage of most ancient standing, but is now composed almost wholly of comparative upstarts, exulting in their vigorous life over the truncated stumps below them. But even these, the monuments of fallen greatness, substantial in decay, stood not a whit more motionless than the slenderest sapling of the living generation, not a breath being abroad to wave their tops or to stir the brown leaves which had held on, laughing at autumn gales and wintry blasts. A sprinkle of snow, crisp and glittering, slightly veiled the wood tracks, and as we trod them “we heard not a sound,” but the brittle gems breaking on the spangled pathway. This was exactly the stillness we have just been noting as an addition (usually) to the effect or mute *expression* of old Winter’s face, when he treats us to its brightest side; but somehow or another we felt it, on the present occasion, more as a feature wanting. Our spirits were so light, our blood danced so briskly, our heart glowed, like our feet, so warmly, and rose so thankfully to the Great Source of all things calm and bright and beautiful, that we longed for something animate to join us in our homage of enjoyment. The wish was hardly conceived ere it was accomplished, for on passing beneath a canopy of low interlacing

branches, we suddenly found ourselves making one with a company of Gnats, dancing (though more mutely) quite as merrily as they could possibly have footed it on the balmy air of a summer's eve. Their appearance was welcome to our eyes, not as flowers in *May*, but as flowers in *January*, and so we sat down on one of the oaken stumps hard by, to watch their evolutions: mazy and intricate enough, in sooth, they seemed. The "set" upon which we had intruded, was an assemblage of those Tipulidan or long-legged Gnats which have been named *Tell-tales*, we suppose, because by their presence in winter, they seem to tell a tale of early spring, belied by the bitter east, which often tells us another story when we turn from their sheltered saloon of assembly. In this sense, however, these are not the only tell-tales of their kind, for quite as common, at the same season, are some other parties of aërial dancers, one of which we fell in with soon after we had taken leave of the first. These were tiny sylphs with black bodies and wings of snow-white gauze, and like "choice spirits, black, white, and grey," (for they wore plumes of the latter colour,) they were greeting the still New Year with mirth and revelry, and that over a frozen pool, whose icy presence one would have fancied quite enough for their instant annihilation. But though (warmed by exercise) these merry mates care so little for the cold without, they are glad enough, when occasion serves, to profit by the shelter of our windows. In ours we often watch them, and you, good reader, had better seek for them, unless you would miss the sight of as pretty and elegant a little creature as any one could desire to look at on a fine summer's, much more a winter's, day. We have spoken of the *plumes* of these winged revellers, black, white, and grey, which dance in the air as merrily as the Quaker's wife in the song; but here be it observed, that our Gnats' wives, with real quaker-like sobriety, rarely, if ever, dance at all, and never by any accident wear feathers.

But stay! here we are arrived at the end of our dance, nay,

at the end of our dancers' lives, without having said a word about their beginning. Well, we have nothing for it but to go backwards, jumping over the steps already made, up to the *premier pas*, our aërial performer's birth and parentage.

Now for the beginning of the Gnat's life of Buoyancy, which commences on the water. Man has been believed by the nations of antiquity to have

“ Learned of the little Nautilus to sail,
Spread the thin oar, and catch the rising gale;”

but he might also have taken a first lesson in boat-building from an object common in almost every pond, though, certainly, not so likely to attract attention as the craft of that bold mariner, the little Argonaut. This object is a boat of eggs, not a boat egg-laden; nor yet that witch's transport, an egg-shell boat, but a buoyant life-boat, curiously constructed of her own eggs by the common Gnat. The boat may be seen, at home and at all hours, within the convenient compass of a basin filled from an adjacent pond. When complete, the boat consists of from 250 to 350 eggs, of which, though each is heavy enough to sink in water, the whole compose a structure perfectly buoyant, so buoyant as to float amidst the most violent agitation. What is yet more wonderful, though hollow, it never fills with water, and even if we push it to the bottom of our mimic pool, it will rise unwetted to the surface. In a few days each of the numerous “lives” within having put on the shape of a grub or *Larva*, issues from the lower end of its own flask-shaped egg, but the empty shells continuing still attached, the boat remains a boat till reduced by weather to a wreck.

Here let us leave it, and follow the fortunes of one of the crew after he has left his cabin, which he quits in rather a singular manner, emerging through its bottom into the water. Happily, however, he is born a swimmer and can take his pleasure in his native element, poisoning himself near its surface head down-

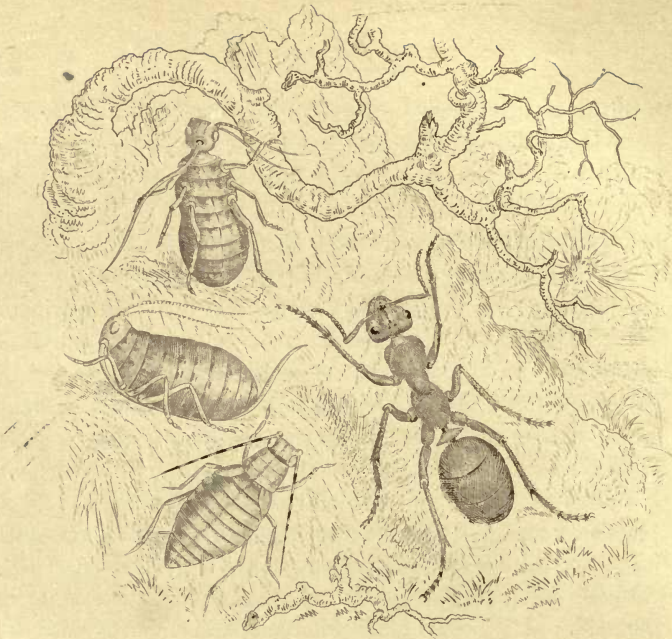
wards, tail upwards. Why chooses he this strange position ? Just for the same reason that we rather prefer, when taking a dabble in the waves, to have our heads above water, for the convenience, namely, of receiving a due supply of air, which the little swimmer in question sucks in through a sort of tube in his tail. This breathing apparatus, as well as the tail itself, serves also for a buoy, and both end in a sort of funnel, composed of hairs arranged in a star-like form and anointed with an oil by which they repel water. When tired of suspension near the surface, our little swimmer has only to fold up these divergent hairs, and plump, he sinks down to the bottom. He goes, however, provided with the means of re-ascension, a globule of air which the oil enables him to retain at his funnel's ends ; on re-opening which he again rises whenever the fancy takes him. But yet a little while, and a new era arrives in the existence of this buoyant creature : buoyant in his first stage of *Larva*, in his second of *Pupa* he is buoyant still. Yet, in resemblance, how unlike ! But lately topsy-turvy, his altered body first assumes what we should call its natural position, and he swims, head upwards, because within it there is now contained a different, but equally curious apparatus for inhaling the atmospheric fluid. Seated behind his head, arises a pair of respirators, not very much unlike the aural appendages of an ass, to which they have been compared ; and through these he feeds on air, requiring now no grosser aliment. At his nether extremity there expands a fish-like finny tail by help of which he can either float or strike at pleasure through the water.

Thus passes with our buoyant Pupa the space of about a week ; and then another and a more important change comes " o'er the spirit of his dream." While a noon-day sun is warm upon the water, he rises to the surface and above it, elevating both head and shoulders, as if gasping for the new enjoyments which await him. His breast swells, his confining corslet bursts, and the head, all plumed and decorated for a more

brilliant theatre, emerges through the rent, followed by the shoulders and the filmy wings which are to play upon the air.—But have a care, my little *débutant*! thou art yet upon the water; an unlucky somerset would wet thy still soft and drooping pinions, and render them unfit for flight.—Now is thy critical moment—hold thee steady—lose not thy perpendicular, or——But why fear we for the little mariner? He who clothes the lily and feeds the sparrow has provided him support in this, his point of peril. The stiff covering of his recent form, from which he is struggling to escape, now serves him as a life-boat. His upright body forms its mast as well as sail, and in the breeze now rippling the water, he is wafted rapidly along. He will assuredly be capsized from press of sail. But see, he has acquired by this time other helps to aid his self-preserving efforts. His slender legs (hitherto hung pendant) now feel for and find the surface of the pool. His boat is left behind and, still endowed with one aquatic power, he stands a moment on the water, then rises buoyant, a winged inhabitant of air!



Let us then strive to keep up our buoyancy.



Aphides of the Oak. Two of the large brown *Aphis quercus*, with their curious suckers, and another species of the oak with the wood Ant, *Formica rufa*, in search of honey-dew,—magnified.

THE WOOD-ANT AND THE APHIDES.



N the midst of an oak wood stands a village or scattered group of rustic habitations. These are curiously excavated in the earth, above which rise their dome-like roofs, thatched in a peculiar manner, with pieces of stick and straw, and each is the common abode of a large community of various ranks and orders. In one of these sylvan dwellings there lived, and perhaps lives still, a good sort of body, a female member of the working class, who set a perfect pattern of industry. Often at work, not only from morn till eve, but from eve till dewy morn, she had turned, as it were, the summer into one long day, and seemed to think that she had thereby acquired a

title to convert the winter, or as much of it as she chose, into one long night. Accordingly, when December arrived, and with it a frost of intense severity, our busy-body shut herself up in her warm underground quarters, and fell into a comfortable dose, and from thence into a slumber, profound as that fabled of the Seven Sleepers. On went the frost, and with it on went the good house-wife's comfortable snooze; but one day the sharp north-east having whistled his lullaby, his brother, the soft south-west, arose to do duty in his stead. The sun, at the same time, drew aside his fog curtain, and shone out so bright and warm, as to penetrate even to our sleeper's underground chamber. She felt its reviving power, and awoke. She then stepped up to the entrance of her dwelling, or, we should rather say, one of them, since it had almost as many as the far-famed residence of John o' Groat. These, however, had been all carefully barred up on the setting in of the frost, so that, all alone, she had to take down one of the barricades she had assisted to erect; and this done, though not without some effort, she was able to take a peep at the outward world, from which she had been so long retired. Presently she bethought her of a certain large family, with whom her own had long been upon the most intimate and social footing, and by whom, indeed, both herself and friends had often been regaled, even when they had gone in a large party to claim hospitality. The question now was how to reach their abode, which was seated under the protection of an old oak pollard at some distance from her own. In summer, nothing could be easier, and, novice as she was in winter travelling, she thought, poor little soul! deceived by appearances, that she should find it mighty pleasant and clean walking over the snow. And so a few hours before, she might; but now the snow being half melted by the sun, she sank and floundered at every step, besides being ever and anon nearly swept away by tremendous avalanches falling from the laden boughs over head. Pushed on, however, by hunger and her own determined spirit, she arrived at length

within sight of the desired oak tree. A few minutes more brought her under its boughs, and into the very midst of the family she had come to visit. Like her, they had all been brought out by the sunshine, and like her had all been sleeping through the frost, a habit in which they exactly resembled our busy friend and her fellows; but here all likeness ended, the people of the oak being as lazy a crew as ever slept or ate away existence. Idlers as they were, yet after their late long fast you may be sure they were all busy enough in breaking it; and as their famishing visitor drew near, her hungry eyes were not slow in discerning that young and old, big and little, were hard at work, not with their knives and forks, but with their pipes, which served them instead of either. Not one of the party took the slightest notice of the pitiful presence of our poor dripping wearied traveller, as she stood at an humble distance, and looked round timidly before she ventured, except by looks, to make known her wants. She first tried to recognize among the younger of the party some who might have been her foster-children; but they were all grown out of knowledge,—at all events seemed to have no knowledge of her. From the juveniles she then turned to one who, judging by appearance, might have been “*le Père de la Famille* ;” brown-coated, round, sleek, and shining, he had been busiest of the busy with his pipe, which, by the way, was much longer and, as his petitioner soon found, much more pliant than himself. Fairly tired out with its use, he had laid this curious instrument of repletion, not aside, for he was too much attached to it, but out of the way, and now depending from his chin and bent over his portly stomach, it passed between his legs, and turned up like a tail behind. Well, this was the one-tailed Bashaw whom our hungry suppliant at length ventured to accost, though why in preference to others we cannot say, unless it might have been from the unoccupied consequence of his air. She related her pressing need; but twice told, or told a hundred times, it fell, as is usual with tales of like burthen, upon a heedless

ear. The little plump brown-coated gentleman coolly brought forward his pipe, and under the starveling's very nose began again to draw in, after his peculiar fashion, the remainder of his unfinished and apparently interminable repast. The short winter's day was nearly at a close, and perishing with hunger, cold, and wet, bitter seemed her end, and soon she fell into a nap which promised to be much longer even than her last, when she was suddenly awoke by a gentle tapping. On opening her eyes, she could just discern the young face of one belonging to the numerous family, all of whom she had reason to believe alike hard-hearted. This little creature had heard and pitied the story of her distress, when she thought she had related it to none but dull cold ears. Now that her elders were again busy with their pipes, the kind-hearted soul crept round to their uninvited guest, to offer her her own supper. The poor destitute creature thankfully received and was wonderfully refreshed by the timely aid. She slept that night in the old tree, and the next day contrived to reach her home.

So ends our tale: but we have yet to disclose the name of our industrious, good-natured, yet withal improvident and rather simple little hero. There is a certain busy worker of whom it is declared, that "she provideth her meat in the summer, and gathereth her food in the harvest," for which sagacious proceeding all teachers of morality, from the wise monarch of Israel downwards, have held her up as a bright pattern of industrious forethought—the prudent Ant.

And now for the way in which these Ant communities pass the winter, and for the neighbours to whom they are accustomed to apply in time of need. These have been already glanced at under the guise of fable. In the plain garb of corresponding fact, let us look at them a little more closely, as their doings stand recorded in some right pleasant and veracious chronicles of the Formic nations. "Ants," says their historian, (Huber, p. 239,) "usually become torpid during the

intense cold, but when the season is not severe, the depth of their nest guards them from the effects of frost. They do not lose their activity unless the temperature be reduced to the second degree of Réaumur below freezing point. I have occasionally seen them walking upon the snow, engaged in their customary vocations. In so reduced a temperature they would be exposed to the horrors of famine, were they not supplied with food by the Pucerons. By an admirable concurrence of circumstances, which we cannot attribute to accident, these Insects become torpid at exactly the same degree of cold as those to which they are thus useful, and recover from this state also at the same time, so that the Ants always find them when they need them." We see from this that the providing instinct is not bestowed where a substitute is given.

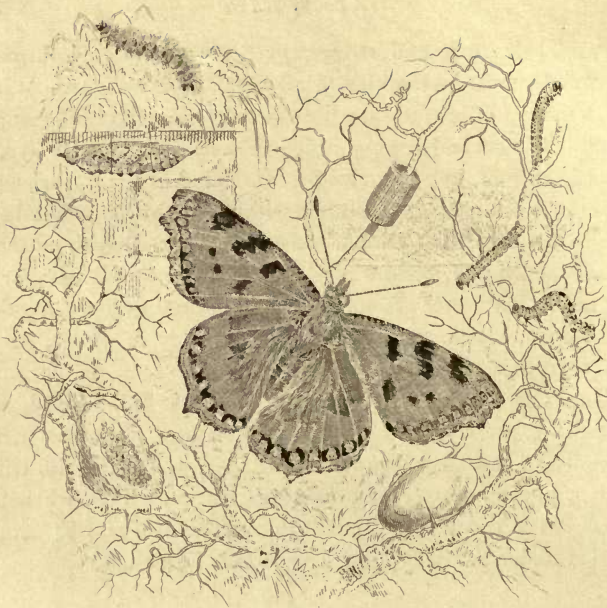
When we say the providing instinct is not given, we must limit the observation to the business of storing grain for winter's want. Though they do not this, they sometimes do as much or more. What say you to the habit of keeping and tending infant herds with a view to future use? At all events, through a prospective instinct, "they will sometimes (says Huber) collect the eggs of Aphides, deposit them in their own nests, guard them with the greatest care, till evolved, and then, as we pasture milch kine, continue to keep an eye over them for the delicious nutriment they afford. Those Ants which do not know how thus to assemble them, are, at least, acquainted with their resorts. They follow them to the base of the trees and branches of the shrubs they are used to frequent, and at the beginning of frost pursue along the hedges the paths which lead to their retreat. As soon as the Ants recover from their torpor, induced by severe cold, they venture forth to procure their food. The honied aliment, thus collected and swallowed, is on their return home equally distributed among their companions." The Ant figured in our story, and prefigured in our vignette, is one of that large species before spoken of, popularly known by the different names of Pisinire, Wood, Hill, and Horse

Ant. Their stick and straw-capped cones scattered through the woods, must be familiar to all wood-land walkers. Without, a mound of confusion, within they are a marvel of arrangement. The conical coping which presents itself to our eye, is indeed the roof, but may also be considered as the upper story, or perhaps several, which contain within them various chambers, one in the centre larger and loftier than the rest, with passages of communication, besides others which lead to the exterior of the nest. The outer entrances of these various avenues, at other times open, are carefully barricaded, not only in winter, but in rainy weather, and also of a night.

Our villager's "many friends" of the old pollard, are intended expressly, though not with reference to character, for a family of the large brown Oak-Aphis, greatest of its tribe, with a pipe or sucker of prodigious length, which, when not employed in extraction of sweet juices from leaf and branch, is carried under the body, passing upwards like a tail.



No one took notice of our poor dripping traveller



The Tortoise-shell Butterfly, *Vanessa urticae*. Suspended beneath the parapet of the wall is the chrysalis of the Cabbage butterfly, *Pontia brassicae*. Above is the hairy caterpillar of the Tiger Moth, *Arctia caja*. To the right are three caterpillars of the Magpie Moth, *Abraxas grossulariata*, attached, as if frozen, to the branches. On the lower stems are the cocoon of a Saw Fly, *Trichiosoma lucorum*, and an old cocoon of the Vapourer Moth, *Orgyia antiqua*, employed as a winter bed for her eggs. Encircling a twig above the Butterfly is a bracelet-like cluster of the eggs of the Lackey Moth, *Clisiocampa neustria*.

LIFE IN DEATH.



WE were loath to begin the year by contemplation of our Insect subjects while buried in a sleep wearing Death's perfect semblance; but we can look at them now, and their dreamless slumber inspires no corresponding dullness, but only curious expectancy; for they are about to awake,

and soon their songs of life and liberty, their morning hymn and their evening boom, will be resounding over the bursting hedgerows and the opening flowers. The Bee is still mute; the Beetle still motionless; the Butterfly (like the bud) still enfolded in its protecting shroud: but they are not the less existent, and to discover *where* and *how*, is a curious object of pursuit, and eke a cheerful one, showing how life and pleasure, activity and beauty, lie lurking under a thousand dry and death-like forms, to which they owe their preservation.

Our first preserve, and, as already noticed, one of the *best*, is our garden, albeit but a very little one. Let us look around, and here on this hedge we discern a something rarely enough seen, although exposed to our view almost everywhere on every winter's day. Amidst the intricate branches of the bare hawthorn, stretches forth an arm, distinguished from the rest by a circlet of beads, a many-rowed bead bracelet, as regularly wrought as bracelet ever worn on lady's wrist, or woven of silk and beads by lady's fingers. This piece of natural jewellery is the work of a certain Mother Moth, whose own eggs, set in an indissoluble weather-proof cement, are the living gems of which it is composed. The deceased manufacturer of this ornament, was a female "Lackey," member of a tribe so called on account of the gaudy liveries (blue and red, white and yellow) in which, while caterpillars, they are arrayed. From these bracelet-eggs will come forth with the opening leaves, just in time to devour them, a new troop of these Lackey varlets, which in due season (about June) will doff their coats of many colours, for the sober chrysalidan-brown, and in July emerge from their Aurelian shrouds and cases, a company of sober-suited light-brown Moths, images of her, their lady mother, the constructor of this bracelet. That we may look into its workmanship a little closer, let us cut it from the hedge, with the branch it compasses, and from which we can slip it like a ring. We find on inspection, that each of the beads or eggs comprising it:

is shaped like the arch stones of a bridge, the whole of them being cemented together in like manner, and thus rendered so strong, compact, and impervious, as to preserve unharmed through winter's wet and cold, the embryo lives for whose protection it was intended.

On another leafless spray of hawthorn hangs another group of Insect eggs, the embryo progeny of another maternal Moth. These, however, instead of being united, as in the bracelet, with strong cement, are loosely scattered, but by no means carelessly, for they are laid upon an oval silken bed, the warm cocoon, which having, while she was a Chrysalis, served to protect the mother, was converted by the maternal instinct of her mothhood into a winter cradle for her eggs. From these, in the Month of May, will appear a brood of Caterpillars, at first dark and hairy, afterwards black and grey, with bright yellow tufts, and red and yellow spots, and from these, after the usual changes, we shall have a company of Moths called "Vapourers," the females of which are almost wholly destitute of wings. One of these was the layer of the eggs in this cocoon, which furnishes, therefore, a striking instance of a seeming deficiency of organization being compensated by an instinctive perception. The mother Moth has no wings wherewith to travel far in search of a safe asylum for her eggs, and she would seem, for this reason, guided instinctively to employ her own discarded covering as a bed suited to preserve them.

Let us seek now for a specimen of insect life (though still it may be only "Life in death") advanced one step beyond its threshold, or from egg to Caterpillar. But without a leaf yet opened for its support, where is the Caterpillar to be found? Perhaps we must go farther than our little garden to discover it, for as we look about us, not a living thing, or one like it, can we see, except that rogue of a thrush, busy yonder at a currant bush. Suppose we watch him, and see if he may not prove a guide, an indicator to assist us in our search. What

is he about? Plucking and picking at the bare branches, when meanwhile, close beside him, lies a snail, one of his favourite morsels. There goes the quick-eared songster, put to flight even by our stealthy step; but let him go, we shall find out, all the same, the business he's been after. Aye, aye, Sir Thrush, we even thought so,—thy large bright eye has been quicker than our own, in discovering, before us, the very game for which we have been hunting. We are not so clever as thou art in detection of life, clothed in the garb of death. On this branch of the currant bush, where thou wast so busy, remains a trio of stiff, stick-like little animals, more like twigs than Caterpillars, and distinguishable only from the branch itself, neither by form nor motion, but slightly by colour, which instead of brown, is whitish yellow, besprinkled with black. These are the Caterpillars of the Magpie Moth, numbers of which, so called from their mode of colouring, are to be seen in almost every garden, flying heavily through the twilight of summer's evenings; and from the eggs of one of them, deposited on this currant branch, came forth, in autumn, the curious specimens of "still life" now before us. In these we have an instance, among others, of Caterpillars defended through the winter by a state of torpidity in which they have now continued for many weeks, without eating, and will thus remain till the breath of spring has roused them to activity, and provided employment for their jaws. The power of Caterpillars, also, in resisting cold has been proved by experiment to be very great, scarcely indeed inferior to that of insect eggs. Those of the cabbage, frozen so stiff as to snap like glass, have yet lived and become Butterflies, while others have revived, after chinking like stones when thrown into a glass.*

What next have we come to, basking in a ray of wintry sunshine on a root of dandelion? It is another Caterpillar, now a very little one, because short of his full growth, not naked, like

* Dr. Lister.

the tiny sticks of the Magpie, but clothed, *à la Russe*, in a brown fur jacket.

The moment we touch him, he curls up like a hedge-hog, and falls from the plant upon the ground. From this practice he is known to some people by the appellation of a "Devil's ring," though why a creature harmless as a dove should have acquired this misnomer it is hard to say. His proper, though not, in his present state, a much more fitting appellation, is the Caterpillar of the Tiger Moth; he is now more like a little bear; but bear or tiger, we have now at home a box or cage-full of the like animals, born from the egg in the early part of last October. Instead of attaining in a few weeks to the full measure of their bulk, as is the case with the summer broods of the same Caterpillar, these, like the little individuals just encountered, have been, since an early stage, quite stationary as to growth, nearly the same as to motion, have kept on the same coats, instead of often changing them, and it is only in mild weather that they eat sparingly of the leaves of dandelion, wherewith it is not easy to supply them. When the latter are entirely nipped by frost or covered by snow, our little winterers subsist as well without them, upon sleep. In this, their nice and altered adaptation to a rigorous season and short supplies, are not the growth and appetite even of these Caterpillars worthy of notice?

With the arrival of April, and a plentiful supply of dock and dandelion green meat, we shall find in our little "Tigers" a proportionate increase of activity and appetite; their skins, as they increase in size, will be frequently cast, and in May, each having attained to the full measure of its growth, will display to great advantage its jerkin of black velvet, ornamented with rows of white studs, from each of which springs a long tuft of gold-brown grey-tipped hairs, forming, *en masse*, an upper coat of fur. Our Caterpillar will then speedily repay us for the trouble of his keep, by showing how cleverly he can make his cocoon, spinning it of his own silk, interweaving it with

hair plucked from his own body, and eking out these natural materials by extraneous ones, such as grains of earth, pieces of leaf, or even bits of paper when placed within his reach. Shut up in this secure asylum he will become a chrysalis, and in two or three weeks, come forth a Tiger Moth complete, a winged creature, glorious in "crimson dyes" and richest brown and cream colour.

* * * * *

Leaving the garden, let us extend our hunt over a wider range, and here, without the paling, we discover, hung upon an oak-tree, another cloak of protection for Caterpillar life amidst the surrounding death of vegetation. We have here no solitary survivors, but a social company, if social we may designate a few dozens of half, or quite, dormant little animals, bidding defiance to Jack Frost from behind the triple tapestry of a silken hammock woven by themselves. This their winter dormitory is of shape irregular, with here and there a brown oak-leaf woven into its outward texture, the interior being divided, also with tapestry, into various snug apartments, where the little inmates lie coiled together by twos and threes, till waked into activity by the coming spring. These, at present harmless slumberers, will grow, by and bye, into tremendous ravagers of the oak and other trees, and will then, on the boughs they have stripped bare, be sufficiently discernible in their tufted *parure* of black, white, and scarlet. These are the progeny of a pretty white moth, yeleft the gold-tail, from a tuft of gold-coloured hair at the end of her body. But stay! What have we here? A sort of rough excrescence seeming to grow out of the tree, just within the edge of its shell-like trunk. When we come to look at it, it seems not, however, like a vegetable growth, it is the wood-built structure of a Caterpillar, and his present dormitory, now that he has cast off his working dress, and put on the monastic habit of an idle chrysalis. Let us look into his cell, or at least on its exterior, a little closer.

The fabric is of oval form, composed of pieces of rotten wood

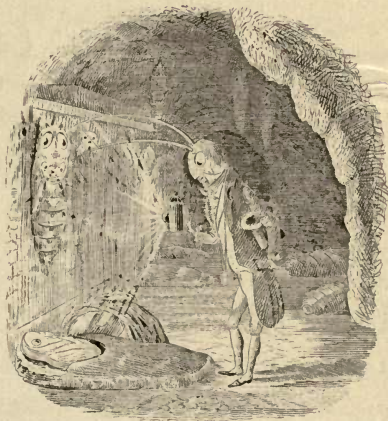
and bark, meshed in and kept together by silk and gluten; the latter renders it so hard, that it refuses to yield under pressure of the finger; we might perhaps force it, though not without trouble, by aid of stick or knife; but let us spare it, leaving its ingenious builder and occupant to finish, unmolested, his winter's nap, to sleep on till the merry month of May; and then, forcing his wooden walls by help, it is said, of an expressly provided acid, to expand his pencilled pinions on the evening air.

But it might please you, curious companions of our rambles, to see for yourselves, the pattern of those pretty pinions; and so in due time you shall, for we have at home almost a facsimile of this wood-built cell, constructed under our own eye by a brother artisan, a "Puss" Caterpillar, which, as a chrysalis, now lives within it. Yonder is the wall of a kitchen garden. Just under the coping of the wall, its only shelter, slung in horizontal position, hangs a chrysalis, which by its shape, angular instead of rounded, as well as by the open mode in which it is exhibited, we recognize, at once, as a future Day-flier; and by the colour, a greenish yellow, besprinkled with black, no less than by its choice of situation, know it to have been, in autumn, a Cabbage Caterpillar, to appear in spring (though not perhaps till May) a large white garden Butterfly. It hangs here attached to the wall by a double support, a silken button at the tail, and a band or loop of threads round the middle of the body, its last pieces of ingenious workmanship while in the Caterpillar form; and we perceive, also, a thin silken web stretched over a small space of the brick above. This is a preparation of its surface to receive the ends of the supporting girth, which would not else adhere.

But look! What is flitting past us, even now? In very sooth, a "Devil's Butterfly" has come from the ivy overhead, or a warmer place below, to reproach us for indifference to Butterfly presence, or to upbraid yonder cabbage sleeper for still sleeping on. There! now she has settled, not on the elder clusters, nor yet on the hazel flowers, but on this leafless hawthorn, and

here do her "golden pinions ope and close," as if she designed to enhance their living splendour by contrast with the death-like branches. Well! be thou Butterfly of "devil" or of "witch," as our brethren of Scotland are wont to call thee (we suppose for thy winter-braving hardihood), thou art a glorious creature, and thy tamer name of "little Tortoise-shell" does but sorry justice to thy glowing beauty.

This "little Tortoise-shell" which, in common with others of her hardy sisterhood, has survived the winter, her radiant robes laid up in ivy or some other close green wardrobe, belongs to the beautiful genus "*Vanessa*," or Fan-winged Butterflies, which, while in their state of spiny Caterpillars, feed for the most part upon nettles. They are distinguished by their warm rich colours, their angular scalloped wings, with points at the hinder margin, and the shortness of their fore-legs, which do not serve the purpose of walking.



In the apparent death of winter



An assemblage of two species of Ants, *Formica rufa* and *cunicularia*, illustrating the mode in which the former attacks the latter, and seizes its larvæ and pupæ. In the foreground is an instance, not uncommon in insects, of an individual retaining its vitality after the loss of its body, and above are a winged male and female of the same species.

A MILITARY EXPEDITION,—AND A NEW BATTLE OF THE AMAZONS.



N the midst of various other nations are now dwelling and have dwelt from the year—nobody knows what—a pigmy people, whom we shall call Formicans, divided into tribes, and long celebrated for their activity, industry, and form of government both civil and military.

The custom of slave-making, as still sanctioned by the example of biped nations, has been always practised by certain

tribes of this pigmy people. In some respects, however, our Lilliputian slave-owners are wofully behind-hand, as compared with those of larger stature. The slaves live as well as their possessors, and on some occasions, the common rule of such relationship being reversed, would seem to take the chief authority into their own hands. With all this indulgence, these little slaves are famous hands at labour. No Jack-of-all-trades, nor maid-of-all-work (for be it here observed that they are all females) can beat them for universal usefulness. The greater number of their owners are of the same sex with themselves, and, what may seem on this account the more remarkable is, that they are all without exception soldiers—amazonian soldiers. It follows, consequently, that their slaves have everything to do. In a populous city they are, at once, the builders, the scavengers, the porters, and the nurses of the infant population. Nay, they are even the feeders of the grown-up free community, which consists solely of the above-named lady soldiery, a few idle gentlemen, and some two or three queens or princesses of the blood. The slave population being thus absolutely necessary to the comfort, nay, very existence of their owners, it of course follows that the keeping up of its numbers is a most important matter. This object is effected by predatory excursions, taken frequently into the territories of those harmless unoffending tribes which furnish the desired supply, and from which the female warriors usually return triumphant, each laden with the trophy of an infant captive.

On a certain day of a certain year, the Amazonian chieftains of Rufia, one of the slave-making states of Formica, assembled to concert a plan of operation for a new campaign or marauding expedition.

It was towards the close of a fine summer's day that the army of the Rufians was seen issuing from their capital. Their march soon brought them to an arid sandy plain, strewn with rocky fragments, between which they pursued their way in winding but unbroken files, their polished brown corselets

glistening like sparks of fire in the glow of the declining sun. Marching with great rapidity, considering their diminutive stature, they soon traversed this desert-like tract without loss or accident, a matter for no small congratulation, seeing the manifold dangers to which their exposed route had rendered them liable.

Onward they pressed, while some of the most ardent of the assailants, leaving the main body behind, rushed forward to attack the enemy's sentinels, who were posted at each of the avenues leading down into the subterranean city.

These watchful guards, who presently gave notice of the approaching army, were, like their assailants, all Amazonian soldiers, only of a much milder and more pacific disposition, being used to combine gentle employments with their profession of arms,—a profession, moreover, never exercised except defensively.

Slavery, as inflicted on others, is a thing unknown among the Fuscans; and their working females, who constitute the chief bulk of the population, are not only the sole defenders of the state, but also perform all the useful offices, which among the Rufians are made to devolve upon the slaves.

Now comes the tug of war. The defenders are assembled in front of their city, fighting for their queen, their lives, and the liberty of their infant population. The assailants, their main body having now come up, are fighting for glory and for plunder, and above all, for the rape of Fuscan babies, to become the future slaves of their own rising generation. Oh! for a Homer's pen to describe the universal ardour and the individual prowess of our pigmy Amazons. By far more numerous are the dusky Fuscans, though in discipline and personal strength they are much inferior to the warlike Rufians. Of the latter we have spoken, hitherto, as Lilliputians, but now we have to treat of them as opposed to a tribe of very inferior stature.

The battle-field, an area of some four feet square, is strewed

with dead and dying. Sulphureous fumes exhale around. Single combatants by thousands, each so eager in their respective contests as to seem unconscious of all besides, have spent their ammunition; but with rancour undiminished, behold them now, limb to limb, head to head, seized by each other and held in savage grip—now wrestling upright, now rolling in the dust; long does the dubious strife continue, till a third, Rufian or Fuscan, comes to turn the balance and throw death into the ascending scale. In another quarter, see perhaps a dozen combatants of either party, all firmly linked together in a living chain, dashing, writhing like a wounded snake in serpentine convulsions, till snap goes a link beneath a mortal blow; but in an instant the dissevered portions reunite, and struggle on with double fury.

Look now at that powerful long-limbed Rufian and the active little Fuscan, her opponent: the latter springs like a cat o' mountain on the chest of her bulkier foe; but dearly does she pay for her temerity. Caught in the grasp of the Amazonian Ajax, she is crushed and falls strangled to the earth. She falls—but let not her conqueror exult—a sister heroine, no bigger than herself, and like herself, carrying in a little body a mighty mind, beholds and vows to avenge her fate. She too springs upon the Rufian, but with more effective grasp, her powerful jaws enclosing, as in a vice, one limb of her athletic antagonist. The Rufian severs in twain the body of her assailant; its lower half falls and is trampled in the dust; but (horrible to see!) the upper portion still retains its hold, supported by the jaws which death has double-locked. The fixed eyes continue to look up angrily into the living face, the rigid arms to encircle the warm body of the wounded Rufian. Vainly she strives to shake off the hideous burthen: like the old Man of the Mountain, it will not be dislodged; and though the Amazon of Rufia left that battle-field, yet

“ — ever more
The lady wore,”

carried, perforce, about her, the slaughtered Fuscan's head and shoulders, frightful trophy of her dear-bought victory !

Who can paint the scene that followed ? Who can number the innocents that day made captive ?

Triumphant was the homeward march of the victorious Rufians, each Amazonian victress shouldering her ravished bantling. Of the little captives, some (the *pupæ*) were wrapt in a sort of swaddling-clothes, whilst others (the *larvæ*), who were younger and not thus enthralled, felt equally ill at ease under the awkward handling of their warlike captors. No longer keeping (in consequence, perhaps, of their acquired encumbrances) the regular array, in which, spite of impeding obstacles, they had advanced towards the ransacked city, their return, for the greater portion of the way, was straggling and irregular : but converging from all points, they at last reassembled again in a compact body before their own capital.

Thus were the free nurseries of Fusca stripped almost to extinction, that the slave nurseries of Rufia might be replenished to overflowing.

* * * * *

The foregoing, like many another historic record of a graver nature, is not, we confess it, exactly true ; but the following notes, drawn chiefly from Huber, the veracious chronicler of the Ant nations, will show that our fiction treads very closely on the heels of fact.

The wars of Ants were observed long ago, and one of their battles, fought under the pontificate of Eugenius IV, was honoured by having for its historian Æneas Sylvius, who was afterwards Pope himself, as Pius II. The most warlike of the Ant tribes, according to Huber, is the Wood-ant, the largest British species, of which we have elsewhere told a tale with relation to other than its military characteristics.¹ These, as well as its domestic doings, are delightfully described by the above writer, and a walk to some neighbouring wood is almost

¹ *Supra*, p. 74.

sure to afford personal acquaintance with these sylvan warriors with their corselets of rusty red, and black head and tail pieces. There also we may see their "fortified cities," their "military roads," diverging from these "citadels" like so many rays from a centre; their regular battles with the same or a weaker species; their skirmishes, their single combats, their ambuscades, their barricades, and all the pomp and circumstance of Formican warfare. But though it was known centuries ago that Ants made war, it was not discovered till of late years, and that by Huber himself, that they also made slaves, seizing them while in their infancy (their state of larva or of pupa) to be trained up for their service, by compatriot slaves already grown up in the same.

The Wood-ant above mentioned has been frequently detected in thus making free with members of its neighbours' infant population, and may probably turn them to the like useful account; but the slave-maker *par excellence* is a larger brown species, *Formica rufescens*, not a native of the free soil of England, though the slave-made *F. fusca*, or the negro, is.



Now flows the tide of battle?



On the left, suspended by its line, is the common Garden Spider, *Epeira diadema*; beneath it is the Labyrinthic Spider, *Agelena labyrinthica*, at the mouth of its hollow snare; and on the leaf adjoining is the green Long-bodied Spider, *Tetragnatha extensa*. The rotund species to the right, and the traveller by the cable bridge, are spinners of geometric webs, of which a small one with its minute artificer, *Theridion*, is represented as often seen constructed within the leaf of a nettle. The little urn-shaped body on a leaf near the centre is a nest of peculiar form guarded by its ingenious weaver.

INSECT AERONAUTS.



THE weather is dry, warm, and still, yet without a gleam of sunshine,—a combination of winter gloom with almost summer mildness. Gossamer is floating or falling slowly through the air, numerous spiders are hanging, motionless, head downwards, in the centre of their geometric webs, lying in wait for prey, while others, restlessly ascending blades

of grass or rail-posts, are inwardly invoking, we suspect, the presence of some gentle air, to assist them in shooting their lines, those threads of suspension, long and strong, on which is to hang the ingenious fabric of their toils. This shooting of the spider's lines, and that associate "wonder," the origin of Gossamer, may as well form our not unseasonable theme.

The apparent flight of the wingless spider from tree to tree, across water, and even through the upper regions of air, has been almost as great a puzzle to naturalists, as the Fly's walk against gravity. It was no doubt soon discovered, that this flight in seeming, was no more a real one than that of an *aéronaut* in a balloon, or than those of the foolhardy adventurers, such as, from the times of Hogarth to our own, have now and then made rope-borne transits from steeple to steeple.

That the spider travelled by a line was apparent enough to nice observers; but the marvel long was, how such lengthy lines could be shot forth, as, when attached accidentally to some fixed body, serve to provide the insect traveller with a cable bridge to cross from plant to plant, or from tree to tree; or when floating loosely, serve equally to promote the more ambitious purpose of bearing him upwards when disposed to mount in air.

However incurious about their mode of formation, nobody can have taken an early morning walk, especially towards autumn, without having noticed these lines or webs of the Gossamer Spider spread over hedge and field, a silken net-work, studded with dew-drop diamonds. The prodigious extent of these woven fabrics only corresponds with the surprising multitude of their fabricators, of whom twenty or thirty will sometimes be found assembled upon one straw of stubble. It would appear, on these occasions, as if a portion of the sky-lark's soaring spirit, infused by his animating song, was at work within these little creeping forms. All seem bent upon the object of ascension, all are in progress towards the summit of their respective stations, whether stubble-straw, blade of grass,

hedge-twig, or railing. Having climbed to the greatest height their legs will carry them, they raise their abdomens to a position nearly perpendicular, at the same time emitting a portion of the glutinous substance which forms their webs; this being acted on by the ascending current, is presently drawn out into long fine lines, when the spiders, quitting their hold of the objects whereon they stand, are carried aloft on their journey towards the clouds.

Having thus seen the way in which Spiders shoot their lines, we come now to the examination of Gossamer, of which these lines form the material. After having served, singly, their fabricators' turn, either as bridges to cross the vacant gulf, or as balloons to rise sky-wards, they are brought together by the action of "gentle airs," gradually assume the shape of fleecy flakes, composed of irregular silky masses, and then by an ascending current of rarified air are borne hundreds of feet into the atmosphere. On falling, when the upward current ceases, it would appear by observation of the naturalist above referred to, that few of these webs contain a Spider, though numerous winged insects are found entangled in them. Dr. Lister, however, found more than once in the webs which he saw fall from heaven, one of these mounting Spiders, which he calls "birds," and describes some of them as converting their floating lines into chariots or balloons of flake, by pulling them in with their fore-feet as they fly. From the top of York Minster, the same observer watched the descent of webs, high above him, and on examination of some caught on the pinnacles of the cathedral, considered such of the adventurous *aëronauts* as he found within them, to be all *juveniles*, of light weight corresponding to their age. One of them he calls "an excellent rope-dancer, wonderfully delighted with darting its threads," adding, that "by means of its legs closely applied to each other, it, as it were, balances itself and promotes and directs its course, no otherwise than as if nature had furnished it with wings or oars."

From the floating lines and *aërial* chariots of the Spiders

which make Gossamer, let us descend to a few of the humbler fabrics woven by the same and various other species, to serve as habitations or as snares.

Who is not familiar (too familiar for appreciation of their excellent workmanship) with the radiate wheel-like nets so common in gardens and on hedges throughout the summer, and on dewy autumn mornings rendered so brightly conspicuous by the liquid pearls which they serve to string? In addition to these borrowed gems, the spiral lines of geometric webs have been shown by the microscope to be beset by a number of viscid globules. The ingenious weavers of these "wheels within wheels," are various species of that tribe of Spiders called, from their lines and circles, the Geometric; those of them most commonly known are "the Garden" (*Epeira diadema*) and "the Long-bodied" (*Tetragnatha extensa*), noticed already among the aëronauts.

Among the out-door fabrics woven by Spiders, which can hardly fail to attract the eye, however little they may fix attention, are those large white broad-sheets, sloping downwards into tunnels, of which numbers are so frequently seen spread out upon the grass and lower bushes. These webs, of which each serves a single occupant both as a residence and a snare, are attached by silken ropes to adjacent objects. The sides of the horizontal broad-sheet, sloping obliquely downwards till nearly perpendicular, form towards its centre a cylindrical tunnel, and sitting near its mouth, the lurker, shaded by the darkness of her covered way, is ready to rush forth and seize on the first hapless wanderer that becomes entangled in her fatal web. This cunning artificer can only be captured by the artifice of getting behind, and driving her upwards and out of her tunnel, into which she always descends upon the first alarm.

In addition to the silken material, of which they always carry with them an internal magazine, there are various out-door Spiders which employ leaves in the construction of their retreats, and that after a fashion both ingenious and elegant.

We have sometimes plucked a rolled-up lilac or young oak-leaf, expecting to find it tenanted by a leaf-rolling Caterpillar, when, lo! upon the scroll being opened, out ran a small long-bodied Spider, which, after lining it with silk, had taken possession of it as his cell. Structures more spacious, consisting not of one, but of several leaves lined and united by a silken web, serve often for the abodes of various Spiders found in woods and gardens; but of these, few are so curious and elegant as a single leaf-cell which we have often found on nettles. In this the point and sides of the leaf being turned over so as to meet at the edges, are conjoined with silk, and on carefully forcing up one of the corners of the green triangle, we intrude on the domestic privacy of a maternal Spider, keeping tender watch over her bag or ball of eggs.

Who has not seen, or is not curious to behold that "lion" of the Polytechnic, the diving-bell? Now those who for lack of opportunity are among the latter, may see a diving-bell in miniature by repairing to the brink of some running stream, canal, or ditch (provided it be not stagnant), in the neighbourhood of London or elsewhere. There they may perceive, shining through the water, a little globe apparently of silver, which surrounds, as with a garment, the body of a Diving Spider.¹

But it is in the pages of Kirby and Spence that we find the habitations and habits of this amphibious architect most strikingly and pleasantly described.² "Her abode (say they) built in water and formed of air, is constructed on philosophic principles, and consists of a subaqueous, yet dry, apartment in which, like a mermaid or a sea-nymph, she resides in comfort. Loose threads, attached in various directions to the leaves of aquatic plants, form the framework of her chamber. Over these she spreads a transparent (elastic) varnish, like liquid glass, which issues from the middle of her spinners; next, she

¹ Diving Water-Spider, *Argyroneta aquatica*.

² Introduction to Entomology.

spreads over her belly a pellicle of the same material, and ascends to the surface" to inhale and carry down a supply of atmospheric fluid. Head downwards, and with her body, all but the spinneret, still submersed, our diver (by a process which does not seem precisely ascertained) introduces a bubble of air beneath the pellicle which surrounds her. "Clothed in this aërial mantle, which to the spectator seems formed of resplendent quicksilver, she then plunges to the bottom, and with as much dexterity as a chemist transfers gas with a gas-holder, introduces her bubble of air beneath the roof prepared for its reception; this manœuvre is ten or twelve times repeated, and when she has transported sufficient air to expand her apartment to its intended extent, she possesses an aërial edifice, an enchanted palace, where, unmoved by storms, she devours her prey at ease." Fancy-woven from the foregoing description is the Fairy Tale which forms the subject of the next episode.



All seem bent upon ascension."



The great Water Beetle, *Dytiscus marginalis*, and the Diving Water Spider, *Argyroneta aquatica*, allegorically typified above, by an armour-clad Knight and an aquatic Nymph.

THE FRESH-WATER SIREN.

PART THE FIRST.



Y air-built bower come and see,
Stranger, come and dwell with me."
An armour-clad Rover is sauntering near;
At the Siren's sweet accents he pricks up his
ear:

"Gramercy!" quoth he. "She bespeaketh me kind,
And to pay her my devoirs I've almost a mind."
Then he looked at the water, exploring it through,
And there, if his sight brought him evidence true,

He beheld 'neath its surface, in silver bedight,
 A most lovely Ladye. No gallant young Knight
 Could wish for a fairer in air and in mien,
 Tho' as to her face, not a feature was seen,
 'Twas so veiled in the blaze of her mantle's bright sheen.

But the Knight he stood dubious, the streamlet was deep,
 He prudently looked, ere he ventured to leap;
 But the Ladye, impatient, upraised neck and hand,
 To grasp hold of his, as he stood on the land.
 Then, ye powers of darkness! the sight that he sees,
 Any mortal's warm blood was sufficient to freeze.
 The most blear-eyed of witches, the nightmare most foul,
 The most grim of hobgoblins, the loathsomest ghoul,
 Would have seemed as the fairest of Eve's lovely daughters,
 To the horrible thing half raised out of the waters.
 Its long hairy arms, so gaunt, rigid, and thin,
 Were as dark and as dry as an old mummy's skin:
 Its eyes, glassy and fixed as a fish's when dead,
 Glared fiercely like fiery coals in its head,
 And like lamps were hung over its horrible jaw,—
 The portcullis that led to its cavernous maw.

The grim-looking spectre but rose as a flash
 That blasted the vision, then sank with a splash;
 And, enwrapped in her mantle of magical light,
 Once more seemed a fairy all beauteous and bright,
 Save only the hand raised the water above,
 Which still circled the wrist of the warrior's glove.
 This wight (and a fortunate hap 'twas for him)
 Was not framed like us mortals in body or limb;
 'Neath the back of his glittering corselet lay hid
 (Like Jack-in-the-box crumpled under his lid,)
 A pair of transparent and powerful wings,
 Could be folded and opened by wonderful springs.

From all that he'd seen, he'd a pretty good notion,
That now was the time to set them in motion;
So, his hand snatched away without further ado,
Wide open the plates of his corselet he threw,
And a moment beheld him high poised in the air,
Looking down with a smile on the Siren's despair,
While uprose from the water her soft witching strain,
Sung sweetly as erst, though, I wist, now in vain.

PART THE SECOND

On the day of her birth,
Or on that of the earth,
Or on some such grand anniversary,
Queen Nature made sport
With the dames of court,
And the bairns of her royal nursery.

From a gilt-edged cloud,
The lark sang loud,
The fish were in ecstasy leaping;
Each leaf danced light.
In the sunshine bright,
And none but the owls were sleeping.

All animate things,
With responsive strings,
Then abroad on the sunny earth,
Unless by age rusted,
Or trouble encrusted,
Were as harps in the hand of mirth.

With the rest of the revellers a young Gallant gay,
Right proud in the gloss of his silken array,

By the glistening water was sauntering along,
 Now cutting the rushes, now humming a song.
 Looking blithely about him, around and around,
 In every direction, except on the ground,
 Our gay Gallant stumbled,—now guess ye on what?
 On viper, or toad, or a sherd of a pot?—
 His hair bristled with fright, with fear dropped his jaw,
 Yet he'd trodden on naught save a feminine paw,
 Hairy and black, and armed with a claw. }
 Squatting, toad-fashion, amidst the sedge
 Which divided the path from the water's edge,
 Sat our former acquaintance, the baffled crone,
 Now wearing no semblance excepting her own.
 Oh! well might our Gallant's heart quiver and quake,
 Well might his limbs like an aspen leaf shake,
 Well his jaw it might drop, well might bristle his hair,
 As the loathly old creature bespoke him thus fair:—

“ Courteous Sir, why this alarm?
 Fear no hindrance, dread no harm;
 I'm a gentle Fairy Sprite
 For beauty famed,
 The Peerless named,
 Suffering under foul despite.

“ In an unpropitious hour,
 A jealous Fay of greater power,
 Enwrapped me in a magic spell;
 Hid beneath this streamlet deep,
 Where water-elves their revels keep,
 For a space I'm doom'd to dwell.

“ Or if I rise to upper air,
 My proper form, so bright and fair,
 Assumes this strange and hateful guise;

Now, if you doubt the words I say,
As (woe is me!) perchance you may,
Then, gentle Sir, believe your eyes."

As she uttered these words, sliding off from the bank,
The ill-favoured thing like a crocodile sank ;
And then in a trice, her form shrouded in light,
In a silvery mantle which dazzled the sight,
Again she uplifted that sweet siren strain,
So oft she had sung, and, of late, sung in vain :—

" My air-built bower come and see,
Come, stranger, come, and dwell with me !"

As she warbled, our Gallant's unused trepidation
Gave way to a species of queer fascination ;
One more dubious look on the water he cast,
One look on the sun—that look was his last !
Underneath the bright water, and 'neath the bright sun,
A most horrible deed on that day was done.

PART THE THIRD.

Fast as acorns in autumn fall into a pool,
In the Siren's receiver dropp'd many a fool ;
I wot, those that got in were ne'er known to get out.
But by tongues in the air it was bruited about,
That a beauteous enchantress who lived upon flesh,
Was the fowler that caught these young birds in her mesh.
Yet the beldame found out, (a fact proved in society,)
That there's nothing so gainful as bad notoriety.
Her decoy overflow'd,—where she caught one before,
Well I ween she would now lay hold of a score.

From old and from young, from high and from low,
From widows in weeds, and from maidens in woe,
There now daily arose such a shrill lamentation,
That it entered, at length, the long ears of the nation.
But cheer up, all ye widows, (whose loss is no gain,)
A champion is near to avenge all your pain !
Cheer up, wives and maidens, dismiss your alarms !
Not long the foul Siren shall work her fell charms :
Look not down to the earth—but look up on high,
Your deliverer comes cutting athwart the blue sky !

On light sprays hung,
By silk cords slung,
O'er-arched by a silken dome,
Is the airy hall,
With water-proof wall,
Where the Siren makes her home.

By a waving screen
Of emerald green,
Her bower is girt about ;
But a lucent gleam
From the sparkling stream,
Looks in from the world without.

For a river sprite,
Or a naiad bright,
'Twas fit—for a fairy queen—
Nay, that pendent cell
Might have suited well,
For the boudoir of sweet Ondine.

In this nice little snugger sat the witch crone,
Deep immersed in the sweets of a large marrow bone.

In the mill of ner jaws it went crunch, crunch, crunch,
As the juices flowed out, she went munch, munch, munch.
Little dreaming that trouble and danger impended,
She took her siesta when dinner was ended ;
No company present, she knew, but the dead,
In perfect composure she nodded her head.
Thus she sat till the moonlight with fitful gleam,
Peered in thro' the glass of the crystal stream.

The foul creature starts—in a tremor awakes ;
Is it the wind that too boisterously shakes
The tremulous cords of her water-girt dome,
Or is it the voice of her crimes coming home ?
She looks up in affright, through a fearful chasm,
('Twas enough to bring on quite a nervous spasm,)
Down comes the water rushing and roaring,
From the roof of her cell in a torrent pouring.
But since witches can swim, what in this to appal ?
Why, perhaps, no great deal, but this was not all.
Riding down on the wave, like a ship in a gale,
The bright moonbeams illuming his coat of mail,
Came the winged knight she'd once thought of entrapping,
And who now, in return, had just caught her napping.
“ At last, at your bidding, I'm come, dame,” quoth he ;
The Siren looked blue, but no word spoke she ;
Then they meet—in as loving collision, I trow,
As when flint strikes on steel, or fire falls on tow.
For the hub-bub around them they care not a rush,
The waters may roar, and the waters may gush ;
The once air-propp'd dome all to pieces may shiver ;
Then, struggling, they rise on the breast of the river.
The knight swam like a drake, the witch like a duck,
Or the Old One's dam ; but the Old One's own luck
Will now and then fail, like the luck of a sinner,
And the witch by *ill* luck had made too good a dinner ;

Indigestion, surprise, and some sickening alarms
Of terror-struck conscience, unnerved her strong arms.
Her foul bloated body now sank and now rose,
While (a scratch for a thrust) she returned the hard blows,
That came pattering like hail on her tough old hide,
As her mail-clad opponent his falchion plied.
Till the moon had gone down did the battle last:
When the game was up, the beldame was cast.
As a Siren, she troubled the world no more,
But a charmed life (by worse luck) she bore,
And with small change of manners, and little of feature,
Was transformed to a Spider, a dark cunning creature,
That beneath running waters constructs a dry cell,
Where through summer and winter she's wont to dwell;
While the knight 'gainst whose prowess her sorceries failed,
Is the "Great Water Beetle," amphibious and mailed.



Her mail-clad opponent his falchion plied.



Transformation of the Silk-worm, *Bombyx Mori*, Eggs, Caterpillar, Cocoon, and Male and Female Moths on the mulberry.

USES OF INSECTS.

LEIGH HUNT tells us, in his Indicator, that an Italian Jesuit, Giulio Cordara, has written a Poem upon Insects, which he begins by insisting that “those troublesome and abominable little animals” were created only for our annoyance, and that they were certainly not inhabitants of Paradise. Now we scarcely know what to think of the good Father’s notion, except that it was hatched, probably, under a swarm of Mosquitos, or under dread of Scorpion or Tarrantula.

Spite of our Jesuit’s flea-bitten theology, we may infer that amongst the creeping and flying things of first creation, Insects

were included, and that the "vernal airs" of Eden were no "desert airs," for lack of a glittering multitude of ever-joyous sporters in the sun and shade. Even for uses economic, who can say but that in addition to

"——Fruits of all kinds, in coats
Rough or smooth rind, or bearded husk or shell,"

and "juice of grape," and "dulcet cream of almonds," the grassy breakfast-board of Eve might not have been furnished with honey purer than was ever collected in Narbonne or on Hymettus. Indeed, if honey was ever stored at all by the Bees of Paradise, it must have been rather for the use of man than for their own, since to amass a winter's provision, would have been labour lost in a clime where reigned "eternal spring."

And why were Bees "immortalised" in the verse of Virgil, except on the same principle as that which led man to deify his brother man? It was wholly for their usefulness, since there is little doubt, that, but for their important economic service, their own wonderful economy would have been as much overlooked as it was misapprehended. Ants, it is true, with no such claim upon human notice, attracted it scarcely less; witness the ancient "records of their wars:" but these are comparatively recent, and it is likely that the marvels of Apian monarchies first led to observation of the ways and wonders of Pismire Republics.

Of the value of honey and its extensive use, we, in our own country and our own times, since the introduction of sugar, can have seldom perhaps entertained anything like a just notion,—a much lower estimate, at all events, than the Ukraine peasant with his 400 or 500 bee-hives, or a Spanish priest, possessor of 5000.

About the uses of wax, a word by-and-by; but with the aroma of honey in our nostrils, and its flavour on our lips, let us think whether we are indebted to Insects for any other

description of palative luxury. Why no, say those who have only lived and looked at home; but they who have been at Rome may tell us that snails are there commonly sold and eaten, especially as Lenten food. Well, but snails are not Insects: true, though they were once so considered; but we have only to go back to the commencement of the Christian era, and we shall find that while John the Baptist was subsisting in the desert of Judea, upon the simple and ordinary fare of "locusts and wild honey," imperial luxurious Rome was regaling, in her banquet halls, upon veritable Insects—luscious Caterpillar grubs, fattened on flour, as we fatten oysters upon meal. This was the Cossus of Pliny, and supposed identical with the unsightly wood-devouring larva of the great Goat Moth,—a lurid red and yellowish Caterpillar, bulky, black-headed, and black-clawed, a darkling dweller in the trunk of oak or willow.

Again, without going back at all into remote ages, we have only to go east and west, north and south, into countries which now brought near by the power of steam, are remote no longer, and we shall still find men in daily commission of what, to the narrow ken of prejudice, may seem the enormity of Insect-eating; thereto incited, in one quarter, by the caprice of Epicurean luxury, in another, by the united pressure of indolence and scarcity. The two extremes of society, civilized and barbarous, are here brought together in one common habit. See, in the West Indies, the French planter *gourmand* (and sometimes the English, as his copyist), seated at his luxurious table, oiling the hinges of his worn-out appetite with those lumps of insect fatness known as the grubs of the Palm Weevil; and then turn to the poor degraded Hottentot, squatted on the arid ground, swallowing, by handfuls, White Ants roasted, or just as often, too hungry or too indolent to dress them, devouring the uncooked Insects.¹

But, after all, none can pronounce these *Acridophagi* or

¹ Smeathman.

Locust-eaters, as monsters of singularity in their mode of diet. Was not "the Locust after its kind" expressly allowed for food by the Mosaic Law? and from the time of its institution even to the present, does not the Law of Nature, ever kind and provident, permit this insect scourge of humanity to be converted into a medium of supporting human life? Since in all countries a prey to their ravages, in Syria, Arabia, Persia, Ethiopia, Egypt, and Barbary, locusts are still an article of provision, in more or less extensive use. And from what but prejudice arises our disgust at Insect-feeding?

Instead of thanking our stars for our own discriminating taste, let us rather thank Providence for that omnivorous appetite common to our race.

We only marvel that Gastronomy (than whom even Necessity herself can scarcely boast a more numerous progeny of inventions and resources) should not, in the demand of her votaries for new modes, have been led to seek more frequently for new *matériel* out of the Insect Kingdom. This, however, may be reserved for some future time. Cockchafers and Chafer grubs may yet become articles for the London spring-market, and Pâtés de Sauterelles may yet have a place in second courses.

When from inward regalements we turn to outward adornments, we are instantly reminded of our obligations to those spinning millions,

"That in their green shops weave the smooth-haired silk."

But stay! are we indeed debtors to those busy insect-artificers, who, by furnishing material for velvet robes and silken gowns and silken banners, have ministered so largely to the pride of the eye and the pride of life? May not the Silk-worm be ranked rather among the dangerous than the useful gifts of nature? We think not; for assuredly, if Silk-worms and silk had never been, some other production, how coarse soever, would have served just as well to keep human vanity alive and

warm. In ancient times that light-winged passion nestled quite as snugly in the folds of fine linen, and the same fact is sufficiently attested by modern instances.

Be it remembered, that, though "silken sheen" has been always considered by us of Europe an article more or less of luxury, in Asia it has been for ages one of absolute use. While at Rome, silk was valued at its weight in gold, and the Emperor Aurelian¹ refused his Empress a silken robe because it was too dear, the "lean unwashed artificer" of China was in some provinces clothed in his silken garment. To the latter country, under the name of *Serica*, has been attributed the discovery of weaving Silk-worm threads, whence the Latin *holo-sericum*, or silken garment, of which the first is said to have been worn by the Emperor Heliogabalus.² In the days of Solomon, we are told, a woman named Pamphila of the Island of Cos, was skilled in the art of making cloth from this country of Serica or China. Du Halle says, that the most ancient of the Chinese writers ascribe the invention to one of the women of the Emperor Hoang Fi, named Silung, and so important was the discovery held, that all the women in the Emperor's palace were employed in rearing the worms and weaving their productions. Nor, indeed, could the Chinese have valued silk too highly, either as an article of home use, or as a very principal one of commerce, before it was cultivated and manufactured in other countries.

As connected with outward apparel, as well as various other arts of ornament, our next obligation to Insects is for dyes. Cochineal, which until the year 1694 was believed in Europe to be a seed, is now known, by putting a few grains in warm water, to be an Insect, a Coccus, something resembling in form those commonly found on the leaves of grape-vines and of the hawthorn. It is a native of China and other parts of Asia, where the nopal or the prickly pear on which it feeds, is indi-

¹ Emperor Aurelian, died A.D. 275.

² Emperor Heliogabalus, died A.D. 222.

genous. Of the great importance of this Insect production as an article of commerce, we may form an idea from the recorded facts, that the East India Company offered a reward of £6000 for its introduction into India, and that some years ago the annual consumption in Great Britain alone was reckoned at 750 bags, worth £375,000.

Another species of *Coccus*, found on the evergreen oak in the south of Europe and Asia, has furnished from the earliest ages a blood-red crimson dye, supplanted now by the *Cochineal*. It was known to the Phœnicians under the name of *Tola*; to the Greeks under that of *Coccus*; to the Arabians and Persians under that of *Kermes* or *Alkermes*. Kirby suggests that this was the dye probably used for the Tabernacle curtains: then, serving for awhile to heighten the Pagan splendours of Greece and Rome, it returned once more to sacred uses, in the scriptural figures of the Brussels and Flemish tapestries.

Lac (called either stick, seed, or shell-lac, according to its state of preparation) is the secretion of another sort of *Coccus* found on various Indian trees, and is used also as a red dye, but more extensively in varnishes, japan, and sealing-wax.

But of all Insect productions, none perhaps is more useful, none certainly more interesting, than wax. The little Bee herself might verily become inflated with self-importance could she be aware of the exalted and varied purposes to which this product of her labours is applied by man. Of all substances for the illumination of holy fanes, wax certainly is the most appropriate—so sweet, so pure, and, in its origin, leading back the thoughts to beautiful fields and groves and gardens. In the halls of festive splendour, no less conspicuously though less appropriately, shines the produce of the Bee's rustic labour. Or walk we along the streets, or enter the lounges for amusement, does not waxen imagery, from the shaven Blue-Beards and pink Fatimas of the barber's window, to the noted and notorious of the earth, the monarchs and the murderers of

Madame Tussaud's show, remind us of the busy Insects, who were the first workers of the plastic paste. Nor, among the curious works of art, whose basis is this work of nature, must we overlook the waxen flowers which, in their fadeless bloom and exquisite imitative beauty, bring a garden (in all but perfume) within the walls of the Pantheon. This is an interesting as well as elegant use of the rifled riches of "buds and bells," thus paid back by perpetuation of their fleeting loveliness. It is needless to enumerate a variety of other uses to which wax is applied, for they are everywhere apparent; even in the comfortless dry-rubbed floor of the French hôtel or château, and the single mahogany table (valued heir-loom of the English cottage), wherein the housewife is furnished by the Bee's industry with a mirrored reflection of her own.

Much more extensive and important than any of the foregoing, but, as less palpable, even more disregarded, are the general uses of Insect existence. Disease engendered of corruption in substances animal and vegetable, would defy all the precautions of man, unless these were aided by scavenger Insects, those myriads of Flies and carrion Beetles, whose perpetual labours even in our tempered climate, but infinitely more so in warmer regions, are essentially important to cleanliness and health.

Some insects, especially Gnat Larvæ, are most useful in keeping water sweet and pure.

As commissioned agents, ministering more or less directly to our various pleasures, we owe no slender obligation to Insects. Besides imparting variety and animation to summer scenes by their "ceaseless hum" and endless diversity of form, they assist in the support of most of our favourite songsters of the garden and the grove. The red-breast, the wren, and the titmouse live almost wholly upon worms and Insects, which also serve the black-bird and the thrush as meat before a fruit dessert. To the delicacies of our tables they are also indirect contributors. Our game grows plump on the nurselings of

the Ant-hill,—the larvæ and pupæ improperly called eggs. Our fish fatten on “the Fly” in all its varieties; and ever our poultry thrive all the better, especially ducks and turkeys, for a sprinkle of Caterpillars, Flies, and Spiders, as a relish with their ordinary food.

The aid afforded by Bees and other Insects in the propagation of various flowers, by conveying on their hairy backs the pollen of one to the stigma of another, is no secret to the botanist, and gardeners know something, and ought to know still more, of the value of certain tribes of insect-eating Insects as checks upon the vegetable ravagers of their own race. Both the gardener and the hop-grower would find it worth their while to keep up standing armies of Lady-bird red-coats against the Aphis legions which ravage their plantations and parterres. Lace-winged Flies and Syrphus Grubs are worthy of all encouragement for the same important service, and, as remarked by Southey, the more Spiders in the stable the less would horses suffer from the Flies.



The Cook after his kind.



ON APHIDES.

On the rose-buds are numerous Aphides, *A. Rosæ*, of the natural size; in the foreground are individuals of the same, winged and wingless, magnified. In the midst of some small Aphides on a leaf is the leech-like grub of a *Scavea Pyrastris*, thinning their numbers, and to the right is a winged Fly, the mature condition of the same. Another species of the genus, *Scavea balteata*, is seen above in different positions on the wing. To the left on a branch of elder, are individuals of the Elder Aphid, *A. Sambucaria*, beneath which is a magnified representation of the same attended by a Brown Ant, *Formica brunnea*, procuring a supply of honey-dew.



UT what sort of insects are Aphides? demands perhaps a reader who is no entomologist. In plain English, they are Plant-lice. But what are Plant-lice? is the question put by another who is no observer of nature. Let us inquire in reply, what is a Wasp, a Spider, a Butterfly? Did you ever

happen to notice one of those remarkable creatures? Well then, we can tell you that for every single Butterfly, you have seen a thousand Aphides, and for every score of Wasps, a million of Plant-lice. Not only have you seen, but scarcely a summer's day has passed without your having destroyed them by dozens. Your foot annihilates them on the grass. They die by your hand on almost every flower-sprig you gather; and with every vase of sweets which you place upon your table, you consign them, without a thought, to the bitter death of famine: so important and fatal is the influence which you, and everybody, are continually exercising over the destinies of Aphis existence, little as you would seem to know about it; although, perhaps, you may be better acquainted with it by sight than you are by name. However blind from indifference to the minutiae of nature, have you not often, when about to pluck a rose-bud or a piece of honeysuckle, almost started to find the one a green mass of moving life, the other with leaves green no longer, but turned black to the eye, and clammy to the touch? You perceive, in short, that what most people call a "blight," but what naturalists only look on as a swarm of Aphides, has been busy with your flowers before you, and turn away disgusted, to seek for less contaminated sweets.

Now suppose we look at the leaf-buds of a rose-bush, which, early as it is, we shall find already occupied by Aphis tenantry, such as have recently emerged from minute black eggs, deposited last autumn on the branches. These are all green, of small size, and without wings, but later (towards the end of May) a single flower-bud is likely to present us with two or three kinds of these infesting sap-suckers, differing in size, form, and colour.

Now for our blight-disfigured rose-bud, which, instead of encasing green and bursting red, displays nothing but a moving multitude—a conglomeration of Plant-lice, which, taken *en masse*, is certainly no pleasing object. For all this, the little winged animal which, as being more conspicuous

than the bulk of its fellows, we shall first single from among them, is no inelegant specimen of nature's Lilliputian workmanship. It has a plump shining body of deep bright green, spotted at the sides with black; long slender legs, inclining to reddish, and, like a bamboo reed, marked at every joint with black or darkest brown. The shoulders, head, and long jointed antennæ are also chiefly black, as well as two diverging spikelets proceeding from the back; while a pair of ample wings, much longer than the body, rise erectly over it.

This pretty insect, and those which resemble it, look like the aristocracy of the wingless multitude by which they are surrounded; and though we cannot pronounce their pinions to be borne as badges of rank, we believe that no reason has, as yet, been assigned with certainty for the partial distribution among Aphis tribes of the organs of flight, which do not with them, as with various other insects, serve as a distinction either of age or sex.

If we examine, now, the wingless multitude—the *canaille* of our rose-bud—we shall find that the individuals which compose it have shorter legs and flatter bodies than their winged superiors, and that they differ exceedingly in size from one another. For the most part their colour is a light green, though some are of a pale red; but however else they differ, all, both winged and wingless, are furnished with one remarkable appendage common to the whole Aphis tribe, to whatever plant peculiar, from the lordly oak to the lowly briar. This is the *haustellum*, trunk, or sucking-pipe, appended beak-like to the head, and which, consisting of a tube both pointed and perforated, serves the double purpose of piercing the leaf and sucking its juices.

The pipes of these our little ravagers of the rose are but as beaklets compared with those of their brethren of the oak;¹ yet they form, we can tell you, no despicable instruments of

¹ Oak Aphides, (*A. quercus*).

destruction, employed as they are by thousands in simultaneous and incessant labour. And this considered, who can wonder at the marvellous and unsightly changes, the spoil and havoc, which these peaceful armies carry in their wake.

For the most part, these Insect marauders, living to eat and to be eaten, seem to have no other business, no thought or care, except on the matter of supplies, and take no trouble to conceal their ranks from the observation of their numerous enemies, or even to shelter themselves from the stormy wind and rain, which sweep them off by millions.

Most of us have heard of honey-dew, and know, probably, that it is a sweet clammy substance, found on the leaves of various trees and plants, especially on the oak, the vine, the hop, and the honeysuckle. As to the real nature of this sweet poison to the plant, opinions differ; and some, perhaps, even of the learned moderns know as much about it as did the learned ancient, Pliny, who doubted whether to call it "sweat of the heavens," "saliva of the stars," or "a liquid produced by purgation of the air." Careful observation seems, however, to have pretty clearly ascertained that this honey-dew, (like the honey of Bees, of vegetable origin,) is extracted with the sap, secreted, and then thrown out by the Aphides in a state of the greatest purity. Besides the profusion of sweets which they scatter around them, like sugar-plums at a carnival, they always keep a good supply within the green jars of their bodies. By the lavish distribution of these saccharine riches, our little Aphides make for themselves, it is true, a few interested friends, while, on the other hand, they owe to their possession a host of devouring enemies.

Réaumur designates the race of Aphides as "the very corn" sown for the use of their more powerful insect brethren; but as animate creatures, as well as gregarious green-leaf grazers, they have been considered with more propriety, as the *oves* and *boves*, the flocks and herds, of those which seem permitted to hold them in possession. Amongst this devouring crew is the

beautiful gold-eyed, lace-winged Fly, which, while yet in its crawling minority, roams through its appropriated leafy fold, making tremendous use of its crooked and perforated tusks, first to slaughter, then to suck in the sweet juices of its victims at the rate of two a minute. Of less ferocious aspect, but not a whit less insatiate than the above, is the green or parti-coloured Grub of a Bee-like Fly, called a Syrphus, of which many varieties are common in gardens, darting from flower to flower, or hovering hawk-like over them. Applied closely to a leaf or stalk by their hinder extremities, which are broad and flattish, the Grubs of these Syrphi may, in June, be noticed by dozens, on the stretch for the Aphis prey by which they are usually surrounded. In this attitude they much resemble Leeches, and like Leeches are in greedy search of blood,—the honied blood of their victims.

But enough of Aphis enemies; and now for the friends, which, as well as foes, they owe to the possession of their honied treasures. We have hitherto seen our flocks of the leaf appropriated as sheep for the slaughter; but those to whom this fact, however new, will appear nothing strange, may smile incredulous, on being told that as “milch kine” they are sometimes kept, tended, and even reared by insect proprietors, for the sake of the sweet milk—the honey-dew—which they afford. In our history of “Fair-weather Friends,” we have already adverted to this patriarchal practice, and have, therefore, only to remind our readers that it is exercised among various tribes of economic Ants, though the Yellow Ant¹ has been termed the greatest cow-keeper of them all. It may require some time and trouble to become witnesses ourselves of this marvellous instance of Formic economy, already proved beyond a doubt by the observations of others; but everybody has an opportunity of noticing that Ants and Aphides are held together by some bond of

¹ *Formica flava*.

union. They are continually seen in company, and a little further scrutiny presently discovers that the Ants are the followers of the Aphides, and entirely for what they can get out of them. Last August, the stalks of an elder shrub in our garden were absolutely blackened at the joints by Elder Aphides, and among these were continually to be seen a multitude of brown Ants, demanding and receiving their supplies of honey-dew as emitted by the former.

Besides the general analogy which exists between flocks of Aphides and flocks of sheep, in their gentle nature, their gregarious habits, and in their being appropriated so extensively for food, there may be noticed, in several instances, a curious kind of external *rapport* between them and the woolly-coated quadrupeds.

There are some species of Aphides which are actually clothed with a sort of wool or down. One of them, a four-winged Gall insect,¹ is found in June or July on the poplar, or may be often noticed at that season, flying or floating about in the air, like a small white tuft of down. Another hoary-coated Aphis is unfortunately too well known to apple-growers under the name of "White Blight." The branches of those trees selected for their pasture by our insect sheep are soon invested by their numerous fleeces with a hoary aspect, appearing in spring and increasing through the summer. These fleeces are found upon examination to consist of a woolly or cottony substance, exuded from the insects' bodies, and under its cover a multitude of these wingless Aphides are incessantly at work with their destructive pipes, sucking up the sweet vital juices of the tree: the old and the young being thus employed together, parents with their offspring, to whom this soft down serves the purpose of a cradle.

There is a peculiarity which distinguishes the Aphis from perhaps every other creature in the animal world,—a physical

¹ *Eriosoma populi*.

enigma about which the divers into Nature's secrets long puzzled their heads in vain, until at last a clever, patient Frenchman¹ hit upon what is considered its solution.

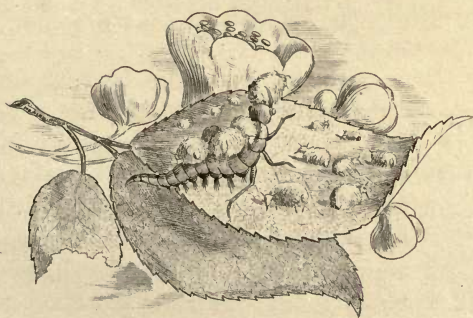
Now, when you see in spring or early summer a group of Aphides, a group of leaves covered with them, or even a group of trees which they have made their own, it is certain (at least we can answer for the fact on good authority), that in all the multitude on which you cast your eye, you will be looking on none but Aphides (whether winged or wingless) of the feminine gender. "Where then are the lords of these numerous ladies?" is a question you very naturally ask. Why, they are not in existence and never have been. The ladies may have had fathers, they have children (to be seen like chickens busy with their bills around them), but with perfect truth, and without a shadow of imputation on their spotless characters, they neither have, nor ever have had husbands.

Now suppose all the elderly matrons presiding over this assembly to have gone the way of all flesh of Aphides, and that you are looking on a similar company composed of their immediate descendants. Still presenting the same remarkable deficiency (if deficiency it be) of masculine members, this assemblage will consist entirely of the daughters and granddaughters of the defunct; and as not one of these, though each in her turn is pretty sure to become a mother, can ever boast a son, so it goes on, even to the tenth generation.

Suppose, lastly, that in September or October you fall in with another company of Aphides regaling on an autumn rose-branch. If so, prithee, pluck it, and let us scrutinize together the assembly by which it is occupied; for being probably the tenth or last generation, it is likely to contain, at length, some of the lords of this curious creation. Aye, now we have them! here, amongst the green "petticoats" are some individuals distinguished by surtouts, some of bright yellow, some of

¹ M. Trembley.

orange, some of sober brown,—colours worn in accordance, it is said, with their youth, middle, or advanced age. All these “Mercuries” wear wings; but even their pinions assume with equal propriety a corresponding hue, deepening from white to transparent black according to the period of their wearer’s standing. Might not our evergreen beaux (for evergreen belles are privileged even by example of feminine Aphides) take a hint from these sensibly clad seniors of the sap-sucking race? Perhaps, however, it is scarcely fair to quote as patterns in anything such out-of-the-way creatures as those we are describing—strangest of animals! but especially in the paternal character. The Insect race is celebrated for having numerous progenies, but these, our patriarchal *pucerons*, are far superior to all the rest. They are no fathers of ten in family, nor of twenty, nor of twenty times twenty, but (marvel of multiplication!) each of these sires can boast of being the actual parent of ten generations, all, save the last, made up of daughters! You who doubt whether this is true, or may desire to know how it has been proved, we refer to the scientific pages of Bonnet, Trembley, Richardson, Rennie, and a host of other unimpeachable authorities.



The Larva wolf in the Aphid flock.



In the centre is the large green Caterpillar of a Moth, feeding on rose petals; to the left the Red-tailed or Lapidary Humble Bee, *Bombus lapidarius*, revelling in pollen, and to the right is the small Cabbage Butterfly, *Pontia Rapæ*; in the suspended case of spirally-rolled leaves is a smaller Caterpillar, and above are two long-horned Japan Moths, *Adela De Geerella*, communicating by antennal language.

INSECT SENSES.



HIS lovely spring-time has brought round a grand festival—a feast of the Senses, which seated, as sisters, at Nature's bounteous board, are now being specially regaled, each with a “dainty dish” peculiarly suited to her liking.

That insects are endowed with senses like our own is now almost universally acknowledged. A child can point to the eyes of a Fly or Bee as readily as to those of an ox; and though

the child judges only by analogy of position and of form, dissection and experiment have alike induced the natural philosopher to assign the name and office of eyes to those large, brown, reticulated bodies, which in the said Fly or Drone-bee are seen occupying the greater portion of the head. Besides these, the same insects, and most others, are provided with three smaller eyes, termed *ocelli*, which resemble shining points, and which are usually placed in the form of a triangle, above and between the larger pair.

We find, therefore, that, both as respects the size and number of their visual organs, Insects have greatly the advantage over all other animals at present known, amongst which there is not one which can boast of five, much less of eight eyes, or of twenty, the complement bestowed upon the Spider and the Centipede.

We are by no means, however, to set it down for granted, on this account, that every insect is a little eagle or Argus in power and quickness of vision; for their many eyes would sometimes seem to serve them like the hare's "many friends," or like the many servants by whom we are often worse waited on than by a few. All that we can pronounce on with any certainty is this—that the gift of sight, as well as of every other sense conferred on insects, is adequate to the exigences of their nature: for the rest, the closest observers are much at variance.

One of the most curious peculiarities observable in insect eyes, in those of them, at least, which are large and conspicuous, is their compound construction. Their *cornea* (or outer coat) instead of being smooth, is numerously divided into what are called facets, each of itself a little perfect eye. Of these, a Butterfly has been assigned, in each compound organ, 17,335—a Dragon Fly, 12,544—a House Fly, 7000.

Possessing such a multitude of eyes or eyelets under one, it might seem that of every single object Insects must be presented with a multitude of images. This, however, we have

no reason to suppose, inasmuch as we, with our pair of single eyes, are not in the habit of seeing double, and as (according to Muller) "each individual facet of an insect's compound eye can survey but a small space in the field of vision, each only contributes to the perception of all things within it. Each separate one does not at the same time see all such objects, but only conveys its impression to the nervous filament with which it is supplied, and the latter being united in the great optic nerve, a common and distinct image is ultimately produced."

The compound eye of an insect would not seem, therefore, to multiply objects to its natural possessor, but it has nevertheless been converted by the ingenuity of man into a curious optical instrument of multiplying power. Through the eye of a Flea (so placed as to command objects with the assistance of a microscope) a single soldier has appeared as at once diminished and multiplied into a Lilliputian army, while the flame of a single candle has been made, in like manner, to represent a grand miniature illumination.

The eyes of Butterflies present on examination the appearance of a multiplying glass of this description, the facets bearing a resemblance to a cut diamond. The *ocelli* or simple eyes, appearing as little points of crystal, seated mostly above the compound pair, and usually three in number, are supposed to be intended, generally as well as in Bees, for the purposes of near vision—such as examination of leaves, flowers, &c, serving for food, or presenting it in the smaller "fry" by which they are frequented.

The position of Insect eyes is in several cases worthy of especial notice: affording in their variations from the common type, so many remarkable instances of that kind creative care which adapts each organ with exquisite nicety to its intended use.

In that little shining Beetle, called the Whirlwig, which may be seen every summer's day whirling about the surface of

smooth waters, each of the eyes is, as it were, divided into an upper and a lower half: the one for looking up into the air, the other for looking down into the water. Those of the Harvest Spider are seated at the top of the head, of all positions the most convenient for a creature living chiefly among grass or stubble. In a common Spider, the eyes, which are all of the simple kind, are no less excellently calculated by their varied positions, front, top, and side-ways, for commanding that range of sight so useful, especially in the hunting tribes, for perception and seizure of their prey.

Of eyelids, Insects, we believe, are wholly destitute, but they are often amply provided with eye-lashes, or with what stands them in the stead of those protective appendages. Their purpose in defending the concave surface of the eye from dust and various injuries is supplied by an assemblage of hairs, with which the *cornea* of Bees and many other Insects is overspread: the hairs which spring from its reticulate divisions having been likened, when viewed microscopically, to a forest of fir-trees.

Linnæus and other naturalists have doubted whether Insects hear, although, from common observation, as well as from general evidence, their hearing would seem as little a matter of question as their sight. Their aural organs would appear less decidedly ascertained. It is, however, usual to suppose that these are none other than the antennæ,—those slender flexible appendages, capable of being directed, like the long movable ears of an ass or a hare, to all quarters, for the conveyance of sound.

Observations, such as may be multiplied daily by ourselves, have also tended to confirm the above inference founded on analogy. Kirby adduces, among other examples, the common use made by those prying parasites, the Ichneumon Flies, of their long, flexible, ever-moving antennæ, which they are accustomed to plunge into the deep nest-holes of the solitary Bees, whose grubs are converted into living receptacles for

their eggs. Some indeed have conjectured that it may be merely with intent to explore the nest, and feel for her infant victim, that the insidious *Ichneumon* thus inserts her antennæ; but since the holes are always so deep as to prevent the possibility of her thus reaching the grubs, as they live at the bottom, it seems much more probable, in the opinion of the writer in question, that she employs them as ears to detect any sound of eating or moving from the occupant of the nest.

Insects are pre-eminently gifted with the sense of smell. No flock of vultures can be directed more unerringly to their revolting prey by scenting its odours from afar, than are certain Insects, such as Dung-flies and Carrion Beetles, whose corresponding office is to assist in ridding the earth of offensive objects. That the sense of smell alone directs the Blow-fly in the deposition of her eggs has been fully proved by the fact of her having, through misguided instinct, been found to lay them on silk wherewith tainted meat has been covered, or upon the ill-odoured *Stapelias*, a tribe of hot-house plants which in scent greatly resemble it.

The Butterfly and Bee, with other winged collectors whose more agreeable business lies among sweet odours, are equally quick scented in their detection at distances almost incredible. From a prodigious height, not less, it has been estimated, than sixteen or twenty feet, the former lights down upon its favourite flower; while the latter wings its way for miles in the exact direction of flowery fields and thymy downs, from which scented breezes bring them invitation. Even when at hand, it is the odour of flowers rather than their appearance by which both Bees and Butterflies would seem to be enticed; for it was found by M. Huber, that four Bees and a Butterfly were speedily assembled round some honey which he had placed, for experiment, in a window, concealed by shutters only sufficiently open to admit their passage. Availing themselves of this liking for sweets and perception of their distant and invisible presence, moth collectors are in the habit of anointing the

trunks of trees with honey or thick syrup, by which means they attract and capture not a few varieties.

Though thus generally admitted to be what the Italians would call most excellent *Nasuti*, Insects still puzzle us as to what exact part of their enigmatical frames may be considered an olfactory organ. This is a point on which naturalists of the highest credit have been so much at issue, that, when we read the opinions of each, and the experimental evidence adduced by each in support of his own, we seem as if we could scarcely arrive, between them, at any nearer conclusion than that Insects must be all nose.

By Kirby and Spence they are invested indeed with the nasal appendage corresponding in position, if not always in shape, with the conspicuous proboscis of a man, a monkey, and the other Mammalia. Huber also opined that their organ of smell is seated in the head and near the mouth, at all events in the case of the Bee; and in proof of his position, he tells us, that, having dipped a fine pencil in oil of turpentine, he approached it carefully to every part of a Bee's head, but without causing the least apparent sensation until approximated to that in question, when the Insect, starting suddenly from the honey on which it was regaling, beat its wings with violence, and would have flown off but for a removal of the offence. On repetition of the experiment the same effect ensued: the angry Bee fanning itself with its wings, as if to blow away the unwelcome odour.

The feet of our insect artificers, curiously jointed and often palmed, seem to partake, indeed, of the power, and to perform in some measure the office of our hands; but in aid of the feet, the antennæ and the palpi (four-jointed bodies near the mouth), popularly termed *feelers*, are also for ever at work to try, touch, and examine.

We come now, in the last case, to the important faculty of taste, with which Insects of all classes, and in every region of the earth, whether of propensities herbivorous

or carnivorous, are found to be no less exquisitely gifted. Caterpillars are, according to their kind, either *general* or *particular* feeders; but even the former confine themselves to particular classes of plants, and among the latter are some so exceedingly nice, that (cormorants as they are) they would sooner die of hunger than eat of leaves other than those which furnish their accustomed food. The caterpillars of those beautiful little meadow Butterflies, the "Blues" and the "Coppers," which feed, in their infancy, on the grasses over which they subsequently sport, are wont, we are told,¹ to appropriate, each for its own peculiar fare, one of the various species which are often intermingled in its native meadow,—that, most likely, on which, with instinctive foresight and discernment, the parent had deposited her egg.

The accuracy of taste conferred upon the Bee has sometimes been called in question, on the ground that this indefatigable gatherer is by no means particular as to the source from whence she collects her honied stores, giving, in that process, more heed, as it would seem, to quantity than quality of material. Yet herein, we may be sure, Mistress Bee knows what she is about, just as well as her insect fellows. She is most likely quite as discriminate as they, in culling for her own appetite and that of her infant charges; and both, it is probable, would come but poorly off were her collections confined to those particular flowers or districts, which, in our opinion, supply honey of the finest flavour, though not, of necessity, that most grateful to the palate of a Bee.

Again, both Bees and Butterflies are well known to be anything but what we call nice in the choice of water—the dirty puddle, or even dunghill pool, being, to all appearances, as acceptable to their palates as the sparkling rivulet or pearly dew-drop; but then, it is said, that Bees only drink from these fountains of impurity in early spring, and, as it is supposed,

¹ Rennie, Insect Miscellanies.

for the sake of the salts which they contain, and which they imbibe, it is further concluded, for a like purpose to that wherewith we, lovers in general of sweets, are accustomed to take spring-doses of saline and other unpalatable flavours.

With regard to the particular organ whereby the taste of Insects is chiefly exercised, both analogy and observation point to the mouth and tongue. In Dragon-flies, Grasshoppers, and Crickets, this little member is rounded, and somewhat resembling that of quadrupeds; in others, its shape is curiously varied; in the Wasp, forked like a serpent's; in Saw-flies, triply divided; in Bees, long and tubular; in Bugs, awl-shaped and sharp; but in all, as has been proved by recent discovery, the organs of taste and digestion are moistened and kept in order by a due supply of saliva from pipes opening sometimes into the mouth, sometimes into the gullet, and sometimes into the stomach, as may be most suitable for the purposes of digestion, and according to the greater or less solidity of food.



The passions are expressed by sounds.



In the centre is the common Humble Bee, *Bombus terrestris*, collecting pollen from the Palm-willow; to the right is a large female Wasp, *Vespa vulgaris*, a winter survivor and foundress of a new colony, rasping wood as material for her nest, and to the left is another individual of the same, in flight, descending to the bank in which she has formed her burrow.

A DEFENCE OF WASPS.



THE month of Mars has been unusually pacific, and "Our Lady's Day" has brought us, in consequence, a thicker sprinkling than usual of early spring flowers. See the glories of the palm-willow, already rich in the gold and silver of her flowery catkins. This willow's wealth would seem, however, like other riches, to have had its attractions for the spoiler, for here is a host of Insect plunderers finally awakened from their winter torpor, and brought from far by

the honied perfume which fills the air. Yet, truly, these are no plunderers; they are the labourers of the hive. We ask your pardon, little types and patterns of industry, and are right glad to see you on the wing. Load your thigh-panniers as you please with golden treasure, *you* are no pilferers, for you take without despoiling, and *you rob for us*.

But stay, what have we here? an idler among labourers! a highwayman among travellers! a Wasp among Bees! A Wasp in March! Yes, truly, and a Wasp of Wasps; a very Robin Hood of plunderers, in comparison with whom the last of his pilfering fraternity, seen in autumn on the last peach, was but a Little John indeed. Let us watch his proceedings. Is he going, *à la coutume*, to attack the Bees, or, contrary to custom, the flowers only? Neither; for scornfully passing over both, he has alighted on this old post beside the willow, and there he stays; by turns walking, and standing, and shaking his wings. Now, he seems to be engaged about something, but what nobody can tell, unless he is biting and gnawing the wood for very idleness; or perhaps (waspish fellow as he is), for very ill-humour at seeing the Bees so happy and so busy around him.

There! he has left the post, and flown down to the bank-side; and now, all at once, he has disappeared within a hole, the *hybernaculum*, we fancy, of some field-mouse, into which he has entered without even the common civility of asking permission. What business is he after? some mischief or another, that's certain, for whenever yet was Wasp or vagrant intent on good? always poking his nose, now into this cranny, now into that, peering here and prying there. Well! there's not an atom of his great golden-winged body to be discerned within the tunnel; so there's certainly no seeing what he is about, and he will not tell us if we wait for his return; besides, a cloud has passed over the sun; the Bees have all gone off, some with panniers only half-loaded, as if expecting an April

shower before its time; and perhaps we shall be prudent to take their warning and go home too.

Here we are, again seated by our own fire, such as is always agreeable on an overcast afternoon in early spring; and we are, consequently, in pleasant mood, disposed to be in good humour with, and do justice to, all; with proportionate desire to atone for word or deed of unfairness committed towards the meanest creature. Now some such debt of compensation do we owe to that gigantic Wasp, met with in our morning walk, and left, just now, exploring the mouse-hole tunnel. We have been employing, it is true, the last half-hour in recording, with the utmost accuracy, those of its proceedings which met the eye; but then we have hinted at its purposes, only in accordance with the common and prejudiced notion that Wasps are always after mischief, while we were all the while perfectly aware that our Wasp was bent upon an enterprise, which, however fraught to us with incipient evil, was in itself highly laudable, and worthy, not of an idler or a freebooter, but of a perfect hero, or, more properly, heroine: this *great* individual being, in fact, of the female sex.

Now suppose a certain princess, perhaps but recently a bride, to have seen her husband and her servants fall successively around her, the victims of some sweeping pestilence, followed by an earthquake. From a violent paroxysm, she herself sinks into a stupor of grief, from which she awakes to find herself alone. Though it would be easier to die, she must live and bestir herself, not for her own sake, but to uphold the honour of her princely house, which can only, indeed, be preserved from utter extinction by the preservation of the posthumous heir, which she is likely to bring, soon, into his desolate inheritance. In earnest, therefore, does she arouse her energies, and so much to the purpose are they employed, that she succeeds, at length, by dint of individual exertion, in founding a new city and a new empire, which, peopled by her descend-

ants, becomes fully equal to those of whose ruins she was the survivor. Of a widowed princess, playing such a part, it would be said that she was a pattern heroine: and we must now advance the claims of a widowed Wasp to a title somewhat similar, for the performance of a like extraordinary achievement.

It is commonly known, we believe, that the race of Wasps, in general,

“Falls as the leaves do, and dies in October.”

Such, in fact, is the case with the numerous herd of *working*, or, as we generally call them, *thieving* Wasps,—with the males (a quiet stay-at-home class with which we have little personal acquaintance), and with a portion of the females; but of the latter, which are several times the size of the others, a few winter survivors are always left in every nest. These (of which our bulky visitant to the mouse-hole was one), after a season of torpidity, awake in early spring; when each taking her own separate beat, chooses a favourable site for a new nest. Of this she is the architect, and at this she works, wholly unassisted, until the eggs, which she takes care to deposit in its first cells, furnish her with assistants in the building and peopling of her colony.

From the female and the male come we now (last not least) to what has been called the Wasp neuter, that correspondent with the worker Bee and worker Ant, wherein the best qualities of both sexes, the tenderness and patience of the one, and the bravery and activity of the other, seem to meet on neutral ground; be it noted, however, that this neutral ground, so rich in every quality but that of productiveness, is, in fact, female.

Bees as well as Wasps are sometimes robbers, and of a much worse description, because they rob their brethren. It is not unfrequent, we are told, for the inhabitants of a distressed hive to turn marauders, under the name of Corsair-bees. These

not only attack, in a body, more prosperous communities, but, like highway robbers, will lie in wait, by parties of three and four, for any unfortunate single Bee returning alone and laden to its hive. "One seizes it by a leg, another by a wing, or perhaps there are two on each side confining or pulling its limbs, while they maul and pummel its chest, and bite its head. This maltreatment obliges it to disgorge its honey, which the robbers eagerly lap till they are satisfied, and then let their prisoner go."¹

The Wasps are above such mean and cowardly proceedings: we never heard, at least, of their turning, under any extremity, robbers of their kind; and therefore, socially considered, they are no robbers at all. Then, for courage, a Wasp is scarcely to be equalled. A single one will venture, it is said, to face a whole hive of Bees after a booty of honey, and is, in fair combat, a match for any three inhabitants of the apiary. The same character of boldness accompanies, and, in our opinion, helps to redeem the depredations of the Wasp as exercised upon ourselves.

Both Réaumur and the younger Huber studied the domestic economy of the common Wasp, as they did that of Bees, by means of glass hives. In this they were greatly assisted by the extreme affection of Wasps for their young; for though the nest be carried off, cut in various directions, and exposed to the light, they never abandon it, or relax in their attention to their progeny. No less admirable than the affection thus testified is their ingenuity displayed, under the same circumstances of distress, in repairing the breaches of their habitation, removing its ruins, and fixing it to the glass by columns of support. Operations such as these, suggested by, and adapted to, unlooked for exigencies, savour certainly of something beyond the limited powers of instinct; and an anecdote related of the Wasp, by Dr. Darwin, exemplifies yet more strongly

¹ Kirby and Spence.

its capacity of adapting means to ends.¹ The doctor saw, on his gravel walk, a Wasp with a Fly nearly as big as itself. Kneeling down, he distinctly observed it cut off the head and abdomen of its prey, and then, taking up the trunk to which the wings remained attached, fly away; but a breeze of wind acting upon the wings of the Fly, turned round the Wasp with its burthen, and impeded its progress. Upon this, it again alighted, sawed off first one wing, and then the other, and having thus removed the cause of its embarrassment flew off with its booty. In the above instance the Wasp seemed to have omitted a part of its usual operation on the bodies of captured Flies, all the wings of which we have several times seen them thus dexterously cut off.

Let us now return to the hole in the bank—and the giantess of her kind who disappeared within it. At her business there we may now make a tolerable guess, namely, that, as survivor of an old house, and sole foundress of a new one, she was employed in laying its foundations, having availed herself, as is not uncommonly the case, of the previous labours of a mouse, to save her own, in the preparatory business of excavation.

This subterranean area being found or formed, her next operation is to lay within it the foundations or walls of her intended city. For this purpose, earth is a material which will not serve her turn, and the nature of that which she employs was long a puzzle. The substance of which the walls and cells of a vespiary are constructed is now, however, ascertained to be none other than paper formed of wood-raspings, mixed with a sort of size, worked to a paste, and subsequently spread into sheets by the Insect fabricator.

We have continually noticed, and any one in summer-time may do the same, a Wasp busily at work with its jaws upon an old paling or window frame. Now, many may suppose that there is little in this worthy of observation; but simply from notice of this trifling and common circumstance did Réaumur

¹ Quoted by Kirby and Spence.

discover the Wasp to be a paper-maker, and was enabled to trace the subsequent processes of her manufacture.

The foundress, whom we saw this morning, had been occupied, while settled on the post, in the first or wood-rasping process of her fabrication; and on entering the hole, she no doubt carried with her a bundle of fibres to be kneaded into paper-paste. Then, supposing that the nest was in an early stage of progress, she would proceed to spread a covering of this substance over the first few cells of her incipient home, strengthening the same with repeated layers. Her next proceedings have been thus described:¹—"She now begins to build the first terrace of her city, which she suspends horizontally, and not, like the combs of a Beehive, in a perpendicular position. The suspension of which we speak is light and elegant compared with the more heavy union of the Hive-bee's combs. It is, in fact, a hanging floor or terrace, immovably secured by rods of similar material with the roof, but rather stronger. The terrace itself is circular, and composed of an immense number of cells made of the paper already described, and almost of the same size and form as those of a honey-comb, each being a perfect hexagon." These cells, however, are never used as Honey-pots by Wasps as they are by Bees, for Wasps make no honey, and the cells are wholly appropriated to rearing the young. When the foundress Wasp has completed a certain number of cells, and deposited eggs in them, she soon intermits her building operations in order to procure food for the young grubs, which now require all her care. In a few weeks these become perfect Wasps, and lend their assistance in the extension of the edifice, enlarging the original coping of the foundress by side walls, and forming another platform of cells, suspended to the first by columns, as that had been suspended to the ceiling. By the end of summer, this city of hanging terraces is completed, and the descendants of the original foundress, according to the calculation of Réaumur, may amount to 30,000 in one year.

¹ Insect Architecture, p. 76.

Scarcely has the nest arrived at completion, through the labours of the youngest generation of its inhabitants, when the early frosts of autumn slightly thin their numbers; their active limbs and wings begin to stiffen; their vital juices to grow sluggish; their bold spirits to grow tame; their supplies, and their energies to seek them, fail both together. When November comes, the Wasp population is cut off as by a pestilence; of those abroad, some fall far from their habitation, others crawl back to die; while those at home, lately so busy in the works of building, repairing, or keeping in order, are now sluggishly inactive. In a little while the city of terraces becomes a city of the dead; its sole surviving dwellers, and they, happily buried in torpor, are some two or three of the widowed females (such as the one seen at work this morning), on whom depends the perpetuation of the race. No sooner does the early spring awake them, than (like her) they depart, each on her way, to found another city.

Our defence is concluded. Can a Wasp-hater remain among its readers?



A widowed winter-survivor



Two workers and a Drone of the domestic Bee, *Apis mellifica*, gathering honey from the nectar-yielding Broom and Wild Thyme, with the Queen Bee above and in the distance, as conductor of a swarm.

BEES AS A BODY POLITIC.



E must now treat of Bees as a body politic. Insect societies, such as those of Bees, Wasps, Ants, and White Ants or Termites, are things *sui generis*, standing by themselves; they present natural pictures to which, throughout the animal kingdom, no pendants are to be found: and it is this which makes them doubly interesting.

A well-peopled hive consists of one queen, several hundred males or drones, and many thousand workers, the latter of which are all imperfect females, though bearing no resem-

blance, either in size or habits, to the pampered individual who nominally fills the throne, and actually fills the hive by supplying its abundant population.

The royal female to whom this endowment of surpassing productiveness forms the very charter of her authority,—the very bond by which she holds the hearts of her devoted subjects, derives from character but slender claims on their respect. During the entire period of her life and reign, which is generally estimated at about two or three years, she performs not a single labour for the good of the community, save that of increasing its numbers; and her bulky body is seldom roused from its wonted state of luxurious indolence, except when her royal spirit is chafed by vindictive jealousy.

The queen of the hive, born, like the queens of earth, no better than her meaner sisterhood, like them, issues from the egg a helpless grub; but the chamber of her birth, as compared with theirs, is of right royal dimensions, vertical in position, and of cylindric instead of octagonal form. Ample room is thus afforded for the full expansion and development of all her members, as she progresses towards maturity; while, to hasten and improve her growth, the food supplied her by her assiduous nurses and future subjects is of the most nutritious and delicate description; not the simple Bee-bread composed of common pollen, and considered good enough for common Bee-infancy, but a rare and curious preparation nicely concocted from flowery juices, and, as reserved expressly for royal nutriment, called by Bee-farmers, “royal jelly.” Thus spaciouly lodged and delicately fed, the favoured grub, when arrived at full growth, spins within her cell a silken shroud; therein changes to a nymph or pupa; and thence, in due time, issues forth in all her dignity of majestic size, in all the splendendency of her golden-ringed body-suit, the more conspicuous for the scantiness of her gauze drapery,—those filmy wings in which alone her outward gifts, instead of surpassing, are inferior to those of her subjects.

The baby Bee, destined to become a Bee-labourer, finds herself, on emerging from the egg, an inhabitant of one of those common six-sided cells, which (as it would appear) is so proportioned as in some measure to limit her growth, and thus prevent her from attaining her full development. To this outward restriction is superadded an inward check in the quality of the food administered by her nurses. In lieu of the royal jelly, that stimulating and nutritious extract prepared only for the queen, her infancy is supported on the simple fare of Bee-bread. Our worker comes forth, mature in all Apian excellence,—modest in habits, a nun among Insects, and a very “sister of charity” among her fellows.

Thus much for the queen and commonalty, the females of the hive; and now for the three or four hundred of the opposite sex, who, as partakers of the royal favour, or as candidates for the same, as well as for their worthless qualities, may fairly be compared to the aristocracy of a state, where birth, not worth, makes the man. We need not describe the Drone, whether of a biped or of a Bee community, since the one is a pattern of, and lends name to, the other. The chief difference between them is this, that biped Drones are to be seen every day of the year, while Bee-drones are to be only seen, because they are only allowed to exist, during those days of summer which intervene betwixt April and August. And truly, living, as they do, to eat, a quarter’s span of luxurious existence, at the expense of those who only eat to live, is a tolerably fair proportion. Such at least would seem to be the opinion of the workers of the hive; for the queen, having meanwhile chosen a royal partner, or partners, from among them, the whole three or four hundred fall by a general massacre, towards the end of July or early in August.

Have those by whom Bee economy has been held up for human imitation ever thought about the awful consequences which would be involved in even a partial copy of the above severely wholesome policy?

Let us suppose ourselves, one moonlight evening in May, taking a garden stroll beside a range of Bee-hives. Instead of the nightly stillness which is wont in Bee cities to succeed the daily hum, there arises from one of these a loud uneasy murmur, which instead of lessening, continues to increase with the lateness of the hour. Our hive is not of glass, but if it were, the restlessness thus audible without would become apparent within, by the evidences of crowding, confusion, and jostling,—by all the tokens, in short, usually attendant on some grand event in expectation. From so violent a ferment of vitality something must of necessity arise; but through the livelong night nothing comes of it, and the morning sun rises on nothing but the same scene and sound of agitated turmoil.

From tokens such as these an ordinary keeper of Bees would merely surmise that a swarm was coming, and an old-fashioned village dame would be sure by this time to be getting in readiness her frying-pan and iron ladle, to bring the parting colony to their new abode.

Mid-day now approaches, and the body of emigrants rush forth, headed, or, it may be, followed by their sovereign lady. These, however, we mean not to accompany even to the adjacent bough on which they have settled, most likely for a temporary rest, because we shall see better by keeping to the parent hive, the effect of the loss of its queen with a large proportion of its population. Row upon row of hexagonal houses hang suspended in clusters from a common roof. Most of them are occupied, some as store-houses for honey and Bee-bread, others as nurseries for Bee-infancy, and, where not otherwise engaged, as dormitories for Bee-labourers, who, with heads and shoulders ensconced within their cells, are accustomed, at intervals, thus to turn their backs on labour, and recruit for fresh exertions. But few enough are the slumberers now taking their repose; the grand event of the morning has raised a general commotion by no means subsided with the absence of its immediate cause; from which mighty effects are yet about to spring.

In consequence of the departure of their reigning monarch and queen mother, our amazonian citizens are, for the present, queenless. What a predicament for a people whose very spring of action is set in motion, as we have seen, by loyalty; but it is an exigence to meet which they are well provided. Among the common six-sided cells which compose the mass of building are perceived some half-dozen oval structures, of more than thrice their size, which are occupied as abodes of growing royalty; and within these waxen palaces have been for some weeks nurtured, in different stages of progression towards maturity, as many young princesses, for one of which the vacant throne is destined. For which of them? is the question which priority of birth and emergence from one of the cells of state is now to settle; for, at present, all these quiescent candidates for sovereignty are swathed in the silken shrouds of their second or chrysalis stage of being,—that wherein Bees are designated by the name of *Nymphs*. With heads turned towards the royal apartments, the queenless subjects anxiously await the moment which is to supply their craving for a sovereign. They wait long, but at length (most welcome spectacle!) a royal lady, perfect in the maturity of her full proportions, issues from one of the royal chambers. A loud and joyful hum proclaims her queen, and her subjects are crowding round to pay their ready homage—when, lo! from another of the state apartments, arrived, like herself, at Bee's and queen's estate, and nearly at the self-same moment, comes forth a second claimant to the regal honours. The rivals catch a glimpse of each other, exchange a glance of angry defiance, then, while the crowd falls back to permit their meeting, rush like she-dragons on one another. Head to head, chest to chest, they strive and grapple, and each has only (in dragon sort) to bend her tail, and fix her venomous dart, and both will fall victims to each other's stings. But, no! at this moment, as if seized simultaneously with panic fear, they part and recede from the deadly and too equal strife.

The spectators have hitherto been looking on, inactive, though not mute, having kept up a ceaseless hum; but now that the royal combatants give way and separate, that hum increases to a perfect uproar, and a few individuals, darting from the crowd, dare to seize upon the retreating queens and stay their flight,—to hang, even, on their “recreant limbs,” and hold them back from further retreat, as well as from advance. But, see! as if their failing spirits were chafed into new fury by the indignity thus offered, they burst from their subjects’ hold, and rush back to the encounter. Again the issue hangs suspended, but not for long; for now, one of the queenly combatants, more powerful or more skilful than her rival, rises above her, seizes one of her scanty wings, and inflicts on her undefended body a mortal sting. She withdraws her barbed weapon, while her wounded competitor falls down—drags her huge length along—then struggles and expires.

The conqueror’s victory is complete; and now surely she will rest proudly satisfied with her success in fair and equal combat. But what does she next? What means she by approaching rapidly to the nearest of the royal chambers, where still sleeps, unconscious, one of the four remaining nymphs of royal breeding? With vindictive fury she tears from its entrance the silken tapestry by which it is partially defended, and now she thrusts into the aperture her poisoned dart, and inflicts on the helpless occupant a fatal wound. Her thirst for rival blood still rages unabated: another hapless nymph, and yet another dies for its assuagement; and she ceases not from the work of murder until her victims and her strength fail together.

While the ferocious queen is thus employed, what is the behaviour of her surrounding subjects? Do they submit tamely to the extinction of the royal race? Yes,—and they do more; for though they themselves lay not a sting on the sacred persons of the young princesses, they aid the cruel

queen in the completion of her butchery ; for no sooner does she quit each scene of her successive assassinations, than dragging from the chamber the body she has left, they hasten to hide from view the evidence of her jealous fury.

It seems quite essential to the welfare of a hive to acknowledge only one sovereign ; but as on this single sovereign, in her capacity of general mother, not only the welfare but the very existence of the state depends ; and as over and above, no emigration can take place without a queen to accompany the swarm, a surplus number of royal nymphs is no less requisite to meet contingencies. It will sometimes, however, happen that, notwithstanding such provision, a hive is unexpectedly bereft of its sovereign, when no successor is existing to supply her place. How then do the people act ? Why, for lack of a queen ready-made, they make one.

For the space of several hours grief and consternation reign in place of the defunct sovereign. Then do the murmuring, but not despairing mourners bestir themselves to supply her place. But how are they to do it ? Can they mould from their ready material—wax, a royal effigy, and then breathe life into the image ? Not so ; but they can resort, for the supply of their exigence, to an expedient almost as miraculous. Let us watch their proceedings in the creation of a queen. Why, this work appears only a labour of destruction ! Surely they are bereft not only of their sovereign, but also of their senses ; and, in a fit of frenzy, are making havoc in the streets of this well-ordered city ! Several parties are here and there attacking the six-sided houses, hastily pulling down their waxen walls, regardless of the young which lie cradled within. Out of perhaps four or five of these unhappy nurslings, all but one are sacrificed by those who had heretofore been their careful nurses ; but for this one, still in its infant or grub estate, a changed and brilliant destiny is in store.

The first process of her manufacture is begun already by the destruction going on around her. Her narrow lodging, by

the sacrifice of those adjacent, is converted into a spacious chamber allowing full scope for her bodily expansion; and soon will numerous nurses be busy, cramming her with that nutritious stimulating substance called "royal jelly." Then in due season, in ten days or thereabouts, out will come an artificial sovereign, in all respects as good as ever issued from a royal egg.

The above curious process of conversion, though supposed to have been known to the ancients, was first published by Schirach (a French naturalist) in his history of "*La Reine des Abeilles*." Although the fact was ascertained by careful experiment, its assertors were for a long time laughed at, and even abused, in one case, by an opponent who, though he saw nothing incredible in the conversion of plants into animals, deemed it the height of absurdity that the nature of an animal should admit of change.¹

¹ Needham, *Insect Manufacture*, p. 313.



"The aged Professor of the Mesmeric art"



On the left side of the vignette is the Lackey Moth, *Clisiocampa neustria*, on the right the Gold Tail Moth, *Porthesia chrysorrhæa*, beneath each of which are their respective Caterpillars, and in the centre is an Oak leaf with a file of infant Caterpillars of the latter species engaged in stripping it of its verdure. Over this hang suspended numerous chrysalides of the black and yellow Ermine Moth, *Yponomeuta padella*, and above all, in flight, is the small Green Oak Moth, *Tortrix viridana*, with its Caterpillar engaged in its ravages as a leaf-roller. From one of these scrolls protrudes the empty shell of its chrysalis, and behind this are the remains of leaves which it has reduced to skeletons.

MOTHS AS DESTRUCTIVES.



THE grand army of Moth-destructives is now in all the activity of a spring campaign. According to their local distribution, these may be considered as attacking us under four principal divisions. One of them is employed on what we may call the out-works, our fields and forest-trees; a

second, coming nearer, spoliates on our gardens; a third, more daring, invades our granaries; while a fourth, boldest of all, attacks the citadel, and makes havoc in our houses.

To begin with the first division of our numerous army. Among the most formidable invaders of the oak are certain caterpillar broods, whose earliest infant steps are accustomed to be taken over the surface of a leaf, which they traverse in marching order.

Our youthful invaders of the forest are not strong enough to brave an inclement season without shelter. No sooner, therefore, do the changing hues of autumn begin to threaten them with failure of their supplies, than with instinctive foresight they begin to prepare cantonments for the winter; and long before the arrival of November we may behold our oak-leaf companies snugly housed in branch-suspended barracks, consisting of hammocks spun by themselves of thickly-woven silk.

Yet awhile,—perhaps towards the beginning of July,—and we pass beneath some ill-fated oak-tree on which the legion has been actively engaged. Where, now, proud monarch of the woods, are thy verdant honours? Where that crown of royalty, which, when other leafy coronets are falling around thee, is wont to be only gilded by the suns of autumn, and still held fast, often glows the richer even for the blasts of winter? That diadem has been stripped from thy brow by a vile caterpillar crew. But where are the destroyers? These ruthless ravagers are nowhere to be seen. But what have we here, resting on the shady side of an oak's spoliated trunk? A little creature of surpassing elegance and beauty; her body seems clothed in a garment of softest swan's down, trimmed at the bottom by a flounce of golden fur; her ample wings of the same unsullied hue, but of more satiny appearance, are bordered by a corresponding fringe; and even her delicate feet are furred or feathered with white nearly to her toes. Her full black eyes, though lacking lustre, do not lack beauty; and rising from her head, in graceful curves, a pair of snow-white plumes,

complete her simple, but most elegant attire. We might almost fancy, as we look at this most delicate of creatures, that we had surprised by day-light one of the fairy elves, fabled to hold their moonlight revels beneath the oak. And truly she is not more beautiful than innocent:—a drop of honey-dew is the coarsest nutriment her frame requires, if even air suffice not to support it. But what has she in common, or what has she to do, with the greedy ruthless strippers of the noble tree she rests on? Everything. She has (with them) a common origin: she is the Gold-tail moth, and they were the Gold-tail caterpillars, of which she once was one, and of a brood of which she will most likely become the parent.

There remains but little more to be said, *en naturaliste*, descriptive of the Gold-tail, either in its form of destruction or of beauty. In the former, however, that of caterpillar, we shall describe its “black and scarlet uniform” with somewhat more precision, and for a reason which will presently appear. Its body-coat of black velvet is enlivened by two stripes of brilliant scarlet down the middle of the back, a row of white, resembling embroidery, running along each side; and again below these, two other scarlet lines. The head and six-clawed feet are shining black, the hinder and intermediate legs yellowish, and the whole body beset with tufts of gold-brown hair.

Leaving wood and hedge-row, let us in May, or even in April, walk through the garden, and observe in what manner the second division of our destroying army may be there employed. Have these intrusive devourers shown more respect to the queen of flowers, than to the monarch of the woods? Not a whit; and see here the proof! On almost every rose-bud is a bundle of young leaflets, all drawn from their propriety, and, contrary to their own expansive inclination, bound together, usually in a fan-like form, by means of a silken tie. If we pull asunder the leaves thus unwillingly united, we shall find, living within and upon them, the agent of their union, a

little brown black-headed caterpillar.¹ Secure from wind and weather, this little imp here feasts at leisure, and nips in the bud many an infant rose, whose cradling leaflets, intended for its own protection, only serve to conceal the proceedings of its destroyer.

Turning from rose to lilac, we find numbers of its leaves rolled up, both cross and lengthwise, their return to a natural position being prevented by silken stays or braces. These are the rollings and weavings of a caterpillar,² which in due season will become, as its mother was before it, a small chocolate-coloured moth, like others, a provident parent, who took good care to lay her eggs on the leaf best suited for the exercise of her offspring's ingenuity and appetite.

The hop-vine and the burdock are sometimes seen to droop their leaves and stalks without any apparent cause. The rational might suppose them fainting under the influence of summer heat; the ignorant imagine them struck by what they call a blight; the fanciful would have declared, in days of greater superstition, that they had been exposed to some "evil eye" of ghost, or witch, or goblin; and, as it happens, a ghost is really at the bottom of the mystery, for a *Ghost Moth*,³ in its caterpillar shape, is gnawing, unseen, at the root of the insect-haunted plant.

Quitting the garden for the homestead and the house, we now come to the third and fourth divisions of our consuming host,—the domestic invaders of our granaries, garments, and good-nature. These belong chiefly to a family of tiny Moths, called *Tineæ*, distinguished as much for the ingenious formation of their own habitations or clothing, as for the ravages they are accustomed to commit within and upon ours. There is a certain member of this *Tinea* family⁴ (one of the smallest of the crew) which delights to play her pranks in the farmer's granary. She there deposits perhaps a score of eggs on a corn

¹ *Lozotania rosana*.

² *Lozotania ribeana*.

³ *Hepialus humuli*.

⁴ *Tinea hordei*.

of wheat or of barley, and no sooner are the caterpillar mischiefs hatched than they disperse, each choosing for himself a single grain to be at once his habitation and his hoard.

Of the same *Tinea* family, but distinguished from the Grain Moths by their appetite for animal instead of vegetable food, are the well-known Clothes' Moths,¹—lovers of fur, wool, tapestry, and dried insect specimens. Most people are well enough acquainted, to their cost, with the destructive operations of these wardrobe pests; but some, possibly, may be ignorant that muffs and silks and stuffs afford food, not only for their appetite, but also for their constructive skill: the little marauders being accustomed to make for themselves out of these materials, what we may designate either habitations or clothing,—moveable tents or closely-fitting body-coats.

The Moth caterpillars of the cabinet scruple not to make free with the wings of their defunct fellow-insects, cutting and clipping them into convenient pieces for the shaping and strengthening of their own body-coats.²

Another little destructive, who is apt to make herself more free than welcome within the precincts of our dwellings, is called the Tabby,³ for what reason we cannot exactly tell. These Moths settle in our libraries and larders; and their numerous families are born and nurtured, just also as it may happen, upon books or butter. Their taste, when literary, is, however, like that of many other bibliomaniacs, somewhat superficial, having reference rather to the leather than the language: the binding, rather than the body, of the works is the object of their esteem. A Moth caterpillar of another description dives, however, somewhat deeper into learned lore, and, devouring the page adorned by mildew and black-letter, prizes books in proportion to their mouldiness rather than their merit.

Our Moth destructives have now been traced home to our

¹ *Tinea pellionella*.


² See *Insect Architecture*, p. 209.

³ *Aglossa pinguinalis*.

houses and our cabinets,—to the clothing of our bodies and the works of our hands,—even to the productions of our brains ; and by adopting them as emblems we may bring them closer still. What better than the tribe of domestic Moths can serve for images of those evil principles, which, taking possession, we scarce know when or how, fret and defile the robes of innocence ? And who of us, alas ! ever guards so closely the chinks and crevices of the moral wardrobe, as not to give admission to a few or many of this destructive race ?

THE MOTHS OF THE BANNERS.

A TALE.

 HE wealth and territories of the noble house of A—— had for upwards of a century been gradually wasting away. In proportion as these diminished, the Roman-catholic chapel attached to the family castle had declined from its ancient splendour, and on the earldom passing for one generation into a Protestant branch, it was permitted to reach the verge of complete ruin.

But behold, now, the holy edifice under process of restoration. Where the voices of choristers once arose, where the mouldering rubbish lately fell,—there hammers are descending. Where the organ once pealed, where the screech-owl lately hooted,—there masons are busy with the mallet and the chisel. Where clouds of incense were once rolling, where the night-dews lately fell, there whiffs of tobacco are rising through the dilapidated roof. A new order of things is at hand : monumental knights, whose spurs have been cut off by the scythe of time, are being newly invested by the aid of the sculptor's chisel ; whilst dames of chaste cold marble are receiving like embellishment from *Carpue*—an restorers of stone noses.

But what is the magic power at whose bidding all these

wonders of renovation are produced? The wizard is named Wealth. The giant power has appeared as a Slave of the Ring, and has been evoked by a ceremony at the desecrated altar. The noble inheritor of the late Lord A——'s poverty has intermarried with the ignoble heiress of a Lancashire cotton-spinner; and this is why the old chapel is putting on its new garment.

It is evening. The chapel-restorers, whose work is well-nigh accomplished, have all departed for the night, and the moon is looking through the great eastern window on the scene of restoration, on the renovated tombs, the reblazoned hatchments, the repolished carvings, the renewed hangings, and, proudly conspicuous over all, on a new banner, which had been raised that morning to replace an old one, of which time, damp, and moths had only left a tattered remnant.

On the fragments of the ancient banner two Moths yet lingered,—the only two which had not been put to flight by the noise and stir of renovation. “Sister,” cried one of them who had just descended on the old banner from a short exploratory flight towards the new; “why art thou thus wilfully determined on keeping to our ruined habitation? ’Tis a hard necessity, I acknowledge, to desert this wasted fabric in which our honourable ancestors were born and died; but it no longer affords us maintenance becoming our exalted rank, and, for the good of my descendants, I have resolved to establish myself up yonder, where our consequence will be properly kept up.”—“Consequence! maintenance!” cried the other; “let my family perish rather than subsist on the vulgar mongrel texture of that painted gew-gaw! Deserting this fabric of unmingled silk, pure even to its last attenuated thread, shall we stoop to provide support for our future progeny on a new-fangled tissue, basely intermingled with cotton yarn? I marvel at thy degenerate vanity: ennobled by my presence, these ruins, however far decayed, retain their pristine grandeur; and so long as one particle remains upon another, here do I abide.”

"And that will be, sister," returned the other, "until to-morrow's dawn, when you and it together will be trampled into dust. But do as you like best, and so farewell, for ever,—unless, before too late, thou seest thy folly." So saying, the speaker flew up, and settled upon the new standard.

Next morning, when the workmen, returning to the chapel, proceeded to sweep away the trampled tatters of the old Banner, they dislodged its sole remaining occupant; and the proud and high-born Moth, after a few irresolute flutters, joined her less pretending sister.

The ruin of the new Banner forthwith commenced, and so it soon proved with the house of A——. Strengthened for awhile by admixture of cotton yarn, and reburnished by plebeian gold, that noble line soon began to exhibit symptoms of decay; for with it there still continued to exist the old consuming principles, pride of birth and pride of show, which are represented by the Moths of the Banners.



"Two Moths still lingered"



The central insects, swimming on their backs, are examples of the Water Boatmen, *Notonecta glauca*, the nearer one being attacked by the little Whirlwig Beetle, *Gyrinus natator*, while the other is gliding head foremost into the extended jaws of the fierce larva of the Water Beetle, *Hydrophilus caraboides*. On the rushes to the right is a Water Scorpion, *Nepa cinerea*. In the distance are the linear forms of two Water Measurers, *Hydrometra stagnorum*, and below them is a Water Bug of less slender growth, *Velia currens*. The figures above represent the Water Scorpion and Water Boatman in flight.

WATER-DEVILS.



AS we have before observed, nothing can have a greater general tendency to augment our enjoyment of the country than the study of Entomology; yet one day, as has happened occasionally before, our little learning on the subject of insects served to cast a shade, though it was but a passing one,

over the cheerful feelings inspired by early spring. We were out in the morning while the dews yet hung heavy in the shade, a few remaining drops still brightly twinkling in the sun. Leaving the beaten foot-path across the fields, we pursued, over the grass, a little private track of our own making, towards an old willow pollard, which, from long acquaintance, and, we believe, sole discovery and appropriation of certain of its venerable charms, we considered to the full as much our own property as its legal owner's. To him it is nothing, probably, but a hollow worthless stump:—to us, it is a perfect treasure-house, more full, a thousand times, in its mouldering decay, than it was in its solid strength. The arm of lightning, shivering picturesquely its highest branch, has struck it into coin for the painter's mint; but it is the gentler hand of Time which has moulded it for us into a casket, and prepared it for the reception of living treasures,—aurelia of Moth, or grub of Beetle, ensconced beneath the case of rotten wood and bulging bark, or packed in its soft lining, the vegetable mould which fills the hollow of the trunk.

Was there a single object within view, or a single sound within hearing, that could possibly awaken one discordant emotion? The sheep in an adjoining field were bleating of peace and good-fellowship; the turtle was repeating her lay of love; and the “shivering note” of the little willow wren, with a thousand others, took up the tale. Pleasure was on the wing in a throng of insect forms, and humming her delight in a chorus of insect voices. Hope was in the season—happiness apparently in everything; and yet, as we sat and looked down upon the smooth surface of the waters,—itself an image of bright tranquillity,—thoughts of violence, cruelty, and destruction took sudden and forcible possession of our mind.

Our eyes were fixed upon the water, which, to the cursory observer, presented nothing but a picture of still life,—of the old willow and the blue sky. To another, examining more closely, the mirrored landscape was not without its moving

objects, and these whimsically displaced as well as inverted—a swallow appearing ever and anon to dip its wing in the clouds or foliage, while here and there a fish seemed leaping from the sky. An eye yet more attentive might also have discerned that the surface of the water was traversed by a multitude of queer dark little Insects, with straight lanky bodies and angular limbs, gliding about in all directions. Skimming the glassy mirror like these, but in shape their very antipodes, were certain other little active bodies, oval and convex as an egg, bluish-black, and polished as a steel corslet; now collected in groups, appearing by twos and threes to embrace each other, then starting off singly as if pricked by contact; now motionless,—then whirling swiftly round and round, seeming absolutely tipsy with their native element, or giddy with the joy of existence. Other creatures of curious boat-like form, almost thrice as big as the last, were cutting the water with their oars: these also looked as if they had drunk, but three times deeper, of an intoxicating draught; for oblivious apparently of the important distinction between head and heels, with the latter upwards and the former immersed, they now hung as it were suspended in the water, then darted off with the celerity of a six-oared cutter. All these living objects, as they met the eye, were in perfect harmony with the surrounding scene of peace. What then could we discern amiss in the pond and its joyous occupants?

We knew that the Insect world of waters was emphatically a world of destructiveness, and that each of the above described creatures, wheeling about so merrily on the pond's surface, was in pursuit, indeed, of pleasure—but of pleasure derived chiefly from the chase of living prey, or the cannibal delight of devouring it. Neither on the surface only, but down to its lowest depths, the pond was teeming with a carnivorous multitude: some (for Insects) of prodigious size, and of uncouth and frightful shapes; others of almost invisible minuteness, but all alike busy and happy in cutting off the happiness of

their fellows. Well! there was nothing in this greatly discordant with the general order of things, natural and moral; but for this very reason the train of thinking it suggested soon brought disturbance to that sensation of peacefulness which all besides encouraged, and we rose from our willow chair almost wishing that we had known nothing of Entomology.

To return now to our own Insect "Devils" of the pond, with whom there is no harm in making a little farther acquaintance. First, for those black lanky-looking creatures gliding about the water's surface;—of these our pond (as most others) affords two varieties; both of a spare and slender make, but one so delicately formed that even its body is scarcely thicker than a line. This line is broken, however, by two prominent hemispheric eyes, which, though set really in the pigmy's monstrously long head, appear to be in the middle of his slender body. He is usually wingless, or with only short parallel elytra. This is the *Hydrometra stagnorum*, or Water Measurer, a common frequenter, from March to August, of every ditch as well as pond, where he glides about to murder the innocent.

The fellow-destroyer,¹ by which this is usually accompanied, is a "bird of the same dark feather," only considerably more bulky, and furnished with close-setting wings. He rows himself merrily along by his hinder feet, the sides of his body being rendered impervious to water by a coat of silvery hairs. Somewhat resembling him in habits and in form, though with body far less lean and long, and with its darker hues enlivened by red and white, is another gliding or rowing destructive, completing the "fatal three," which, insects themselves, are for ever cutting short the slender threads of insect life. It was not this morning visible on the willow pond; and though we have at times observed it on still waters, it usually prefers to

¹ *Gerris lacustris*.

buffet the running stream, to glide, not with, but against the current. This is known to naturalists as the *Velia rivulorum*.

A word, now, for that little whirling devil, which, albeit black in hue, is of less satanic seeming than the above; for in place of long rigid limbs and angular movements, he displays, in his circular gyrations and oval form, something of beauty, in his polished corslet, something of brightness, and in his social sportiveness, something of good fellowship. He and his merry mates,—not the less destroyers,—are the little Whirlwigs,¹ those bluish-black diamond-like Beetles, which few can have failed to notice, whirling about on every pool. Their playful evolutions would seem, however, but a *passe-temps* in intervals of sterner business, that of putting a full and fatal stop to the sports of other water-revellers, weaker than themselves.

That topsy-turvy imp of darkness, which, in proportion to its superior magnitude, creates yet greater ravages among his fellows of the flood (those before named included) is the Water-Boatman.² Swimming on his back, legs upwards, tail touching the surface, head inclined downwards, he waits, motionless, on the look-out for prey, till, on the least alarm, he rows off with infinite speed by help of the hairy fringe, with which his hinder feet are thickly bordered. As well as with oars, our boatman is provided with wings, useless in water; but serving, in case of drought, and failure, in consequence, of his native element, as a means of transport to some new scene of violence.

But these which appear upon the surface are only a few, and not the most terrible amongst the devourers of pond and streamlet, for gliding through the depths below, or lurking crocodile-like, within the mud or water-weeds, a multitude of fierce and frightful insects, some in a state of maturity, others in progressive stages, live solely by destruction. One of these

¹ *Gyrinus natator*.

² *Notonecta glauca*, or *furcata*.

is the Water-Scorpion.¹ Stretching out its long lobster-like fore-arms, which are terminated each by a sharp claw, serving the purpose of a hand, it seizes and holds fast its prey, which it then pierces with its sharp beak or proboscis,—a pointed hollow weapon, serving the further purpose of sucking the juices of its struggling victim. So thoroughly savage is the nature of this creature, that he would seem to destroy for destroying sake: and it is related by Kirby that one of them, put into a basin with several tadpoles, killed all, and ate none.

All the aquatic animals above named are insects in the last, or adult stage of their existence; but the two very remarkable destroyers we shall now describe have yet to put on other and more perfect forms, although their carnivorous capabilities are fully developed. A common inhabitant of ponds, or of the mud at their bottoms, is an ugly-looking animal, with a light brown wingless body, and six legs, having the air and movements of a little reptile, more than of an insect. His great projecting eyes, always on the watch for something, eager to devour, have chosen a victim. With cat-like stealth, he crawls towards it. Now he is close upon his prey, and his next movement will surely be to seize and grasp it with the foremost pair of his hairy legs. But what now? Surely a mask is falling from the caitiff's face! Yes, a veritable mask, which has hidden, hitherto, both from us, and from his victim, the grimmest half of his grim visage. He has dropped his vizard but not entirely, for it still hangs pendent from his chin. And now, do we see aright? the mask, as if touched by the wand of Harlequin, assumes another shape; it has changed into a sort of toothed and jointed trap, which opens, then closes on its prey, an unlucky tiny tadpole, which is brought, wriggling, into convenient reach of the jaws ready to receive him.

Let us now leave our crawling masked assassin to wallow in mud and murder at the bottom of his pond, and delight our

¹ *Nepa cinerea*.

eyes by looking at an insect of surpassing brilliancy and beauty, disporting on the wing above the water. Its graceful shape, brilliant colours, and glittering gauzy wings, have won it from the gallant French the appellation of *Demoiselle*. Among ourselves it is known better by the names of Horse-stinger and Dragon-Fly. The first is a misnomer, because, to horses, it is entirely harmless; but amongst the insect crew it is a veritable dragon, to the full as fierce and cruel as our murderer in the mask. No wonder! for it is his very self,—one, at least, of his very kind. He has laid aside his mask, and therewith his grub estate, but retains, as a perfected and brilliant Fly, the very same propensities as when an unsightly crawler,—propensities exercised, now, in the devouring of Butterflies in air, instead of Tadpoles in water.

The arch-fiend with which we shall close our abridged list of *Water Devils*, is the British *Hydrophilus*, the devil *par excellence* of the solar microscope, and of exhibitions,—a species of Water-Beetle, in its first or larva stage of being. This creature exceeds, perhaps, all its carnivorous fellows in size (measuring, when at maturity, an inch and a half); in courage, as attacking even small fish, and other animals larger than itself; in ferocity, and in the possession of destructive weapons, powerful, remarkably numerous, and singularly adapted to their designed purpose. Broods of these murderers have been passing the winter in embryo, that is, in the egg, enwrapped, like innocents, in silver coverlets, or, to speak more correctly, in silken balls, suspended, cradle-like, to the stems of submerged water-weeds. These are now, however, detached from their supports, and may be seen floating on the surface of stagnant pools, exposed to the genial influence of the sun. By this, if not already, they will be soon awakened into life, when their first employment will be to gnaw a hole in their nests, whence they will descend to the bottom of the water, each a walking and swimming little animal, with six legs, a set of hairy, fin-like appendages, and a bi-forked tail. But most

conspicuous and notable of all its appurtenances are those which arm the head, the large strong jaws curved and pointed, opening and shutting like a pair of forceps, with an apparatus of other instruments, smaller and finer, to assist in piercing, tearing, masticating, and sucking the juices of its victims, which comprise, as the infant destroyer advances to maturity, almost every aquatic insect within reach;—and in failure of these, the brethren of one common nest will turn their fangs upon each other. On a fine sunny day, these insect sharks arise to the surface of the water where they delight to bask. If watched, they remain motionless, with their jaws extended, and if a stick be presented to them, they will seize it, and will sometimes, it is said, permit themselves to be cut to pieces rather than relinquish their hold. After the completion of its life as a larva, the *Hydrophilus* immures itself in a cell of its own formation, near the water's edge, and, after passing through the next stage of pupa or chrysalis, emerges a perfect Beetle.



He rows off with infinite speed



Seated to the right of the Dahlia is the beautiful Red Admiral Butterfly, *Vanessa Atalanta*, and to the left the Common Blue, *Polyommatus Alexis*, both exhibiting their under-wing painting. The Butterfly descending towards them is the Common Copper, *Lycana phlaeas*.

BUTTERFLIES IN GENERAL.



THOUGHTS on Butterflies always bring with them thoughts on flowers. We have viewed them already in some of their mutual relations; but under this, their combined aspect, they are both so doubly pleasant to look upon, that we must trace here a few of their corresponding features,—some of them perhaps for a second time. Flowers seem, as it were, to impart a portion of their own characteristics to all

things that frequent them. This is peculiarly exemplified in the Butterfly, which must be regarded, *par excellence*, as the Insect of Flowers, and a Flower-like Insect, gay and innocent, made after a floral pattern, and coloured after floral hues. But even with the insect families which are usually dark and repulsive, that, for instance, of Cockroaches, which are for the most part black or brown, the few species which resort to flowers are gaily coloured. What a contrast also between the dark loathsome in-door Spiders, and their prettily painted, green and red, and white and yellow brethren of the field and garden, which seek their prey among the flowers; while more striking still, is the difference between the wingless disgusting plague of cities, and the elegantly formed, brightly coloured, winged Bugs, which are common frequenters of the parterre. Whether this be imputed to the effect of light, or assigned poetically to the breathing influence of a flowery atmosphere, and the tendency of all things to produce their similitudes, there lies beneath the natural fact a moral analogy of application to ourselves.

There has been traced by naturalists an intimate analogy of states and developments between the Lepidopterous Insect and the perfect vegetable. The Caterpillar, disclosed from the egg, encases in its various skins the gradually expanding form of the future Butterfly; as the plant, burst from the seed or bulb, encloses in its successive integuments (of root, stalk, and floral leaves), the flower and fruit in process of formation. The chrysalis, that shroud or cover which at once protects and imprisons the winged creature it encloses, finds its correspondence in the defensive calyx which enwraps the delicate corolla. Both burst from their envelopes in perfect form,—the Insect to die, the flower to fade, soon after having provided for the continuance of their kind.

In the habits, no less than in the structure, of the Butterfly and the flower, there is observable no slight degree of correspondence. In the gloom of night or of cloudy weather, the

Insect folds its wings, the flower its wing-like petals; and as flowers love and turn towards the sun, so Butterflies open their pinions to receive his welcome rays,—sometimes alternately closing them in fan-like motion, to temper probably his too ardent beams.

As the blowing of flowers can be forced or retarded by artificial heat or cold, so it has been found with the emergence of Butterflies. Réaumur made many successful experiments, by aid of hot-houses and hens, upon various chrysalides, from which he caused the premature evolvment of the perfect insect, and proposed by employment of the same means on an extensive scale, to cause summer flowers and summer flutterers to appear together in the midst of winter.

Darwin had a pretty fancy that Butterflies usually resemble in colour the flowers they are most accustomed to frequent. The poet-naturalist carried this notion doubtless beyond nature, but the idea is one which seems to shoot less wide of its mark than many aimed from the Litchfield long-bow. There is a very large proportion of white and yellow flowers which we see visited, perhaps, most frequently, by an equally large proportion of white and yellowish Butterflies, owing probably to the preponderance of each. The greater number of blue Butterflies are certainly, however, accustomed to frequent the blue flowers most abounding in chalky soils; and the rich tone of colouring in our autumn flowers harmonizes well with that of autumn Butterflies.

We might continue at greater length our remarks on Butterflies as connected with flowers, which make verily part and parcel of their existence, but space forbids us; and now returning to their relations of use, we must notice somewhat more minutely than most people, perhaps, are in the habit of doing, the manner in which the delicate delights of rest and refreshment, provided for them by the flower, are turned to account by these luxurious insects. Let us follow one to the garden. Behold him seated on his velvet cushion, the corolla

of an aster or a single dahlia ; in its centre, his table of regalement, on which a whole service of golden vases are set before him in due order. His long spiral tongue has hitherto lain coiled betwixt two side appendages, but now unrolling, he plunges it to the bottom of a chosen chalice, then partially recurves, and indraws his honied draught through the tube-like sucker. Again and again, he quaffs like an "Alderman"¹ as he is. We know him by his bulk and the richness of his furred and velvet robes, scarlet and black, relieved with white. But see how the rights and pleasures even of an Alderman Butterfly are open to invasion ! Look at that impertinent prying "Argus,"² tired of his rustic fare in heath or meadow, and hovering overhead, allured seemingly by sight or scent of richer dainties wherein art has had a finger. Down he lights and seats himself beside the dahlia table, an unbidden guest. The Alderman's translucent eye from red grows redder, and his gorgeous robes shake with indignation as he sees the bold intruder unroll his slender tongue and dip it into one of his own appropriated cups. Still, however, he restrains his ire within the bounds of Aldermanic dignity or prudence ; he attempts not to drive the invader from his invaded board. But, can it be possible ? the little Argus, not content with a dinner upon sufferance, has actually become the assailant of his unwilling host. He closes his blue wings, opening, in the act, a hundred eyes, and then tries with his pigmy body to dislodge, by shoving, the corporation of the Alderman. But the patience of the latter, and his prudence, are now put to flight. Both start from table, mutually buffet and ascend in air, mounting higher and higher as their choler rises, each growing hotter and hotter in his progress towards the mid-day sun. Now blue ! now red is uppermost ! Now the light weight and azure pinions of the little Argus—now the heavy body and flapping wings of the burly Alderman ! Which will

¹ *Vanessa Atalanta*, Alderman or Red Admiral Butterfly.

² *Polyommatus Argus*, *P. Alexis*, Common Blue Butterfly.

be the gainer of the day? For once, Might and Right are both upon a side, and for that reason, doubtless, Might seems worsted. The combatants have risen so high that they are almost beyond our dazzled sight——but now behold, descending and alone, the little blue aggressor. He has driven his opponent from the ærial field as well as from his honied fare, which he now returns to appropriate and discuss at leisure as he resumes his seat upon the dahlia's vacant velvet. The bold urchin has, however, paid forfeit for his rudeness and pugnacity. When he first alighted down beside the Alderman, he was a Beau Butterfly of the first water,—but now, his blue bravery, late so bright and glossy, all worn and torn and jagged, he looks what he is, an impertinent, pilfering, quarrelsome little varlet.

Besides the above (the Blue Argus), Mr. Knapp in his "Journal of a Naturalist," notices as "contentious animals, the common White Butterfly¹ of our gardens, and the small Copper,² as quarrelsome as he is handsome,—often fighting even with his kindred, when he meets a fellow on a September knot of China-asters." It has been noticed by the same observer, that clouds seem to abate the ardour of contending Butterflies, and that not unfrequently when two are engaged on high, in ardent and unheeding strife, the arrival of a third party in the shape of a hungry bird at once settles the difference of the pugnacious pair by their conversion into a flying meal. But the most knowing among naturalists, as well as those of other professions, are for ever differing; and these Butterfly struggles, viewed by the writer last mentioned in the light of combats, have been regarded by another³ in the more pleasant one of pastime,—considered merely as frolicsome exuberances of the vital principle played on by the buoyant air, expanded by the sunshine in their wings and bodies. Neither are their buffetings considered by Mr. Rennie so rude by half as they appear, and he urges against the probability of

¹ *Pontia Brassicæ.*

² *Lycæna Phleas.*

³ Rennie.

their angry purpose the number of the insects (sometimes as many as five or six) seen together in collision. Of this argument, however, we scarcely see the force, unless it could be proved that Butterflies, being wiser than men, never took sides or part in each other's quarrels. But as no mortal consequences have ever, as we know of, been seen to result from these rencounters in the air, we must perhaps leave unanswered the question of their dubious meaning,—that of rough play, or gentle warfare,—till the progress of phrenology enables us to pronounce safely on the amount of combativeness in a Butterfly's skull. Meanwhile, we would much rather incline to the pacific notion, and in poetic justice admit our favourite, (until we know to the contrary) to be

“A beautiful creature
That is gentle by nature;”

even though by so doing we throw a double stigma, for his pursuit and devourment, upon our favourite robin.

Butterflies are said to be the thirstiest creatures (save Ants and Crickets) of all the Insect community; but however they may get tipsy, perhaps quarrelsome, over their cups of honied wine, it would appear that they are the best friends possible, when, as is no uncommon occurrence, they meet together in numerous water-drinking assemblies. Like a row of white-muslin Misses at a Temperance Tea-Meeting, the small white Butterflies are often in hot weather to be seen sitting, side by side, on the margin of a half-dry pond, where

“—— in the same bathing their tender feet,”

they are enabled at once to quench their thirst for water and, very likely, for gossip.

In these social assemblages but few females are accustomed to be present, though no law of absolute exclusion would seem to exist against them, as in the ærial dances of the Gnat. The prevailing absence of lady Butterflies from these water-drink-

ing *réunions* has been assigned rather to their habits, which being of a most laudable stay-at-home character, do not lead them to those flights in the burning sun which excite the thirst of their roving partners. We should be the more unjust in passing over without due praise this quiet domesticity of the female Butterfly, because it would never seem with her, as with some of her Moth cousins, a mere virtue of necessity. The latter possess, in some cases, only apologies for wings, or such as are adequate only to the very brief support of their heavy bodies; whereas the Butterfly, maid or matron, is furnished with a pair to the full as ample as those of her suitor or her mate.

Many Butterflies have a wide geographical range, and one of them, the Painted Lady,¹ is remarkable for being a denizen of each quarter of the globe. With us, this elegant insect is in some seasons plentiful, in others rare. Its spiny caterpillar is a feeder on spiny leaves, those chiefly of the great spear-thistle. Thistles, by the way, even way-side thistles, acquire in our sight a thousand piquant charms as soon as we begin to notice insects. We have just seen in its leaves the nursery of the Painted Lady, one of our prettiest Butterflies, and they afford the same to one of our prettiest Beetles, the little green Tortoise. Its honey-scented flower is a load-star of attraction to a humming host of *Hymenoptera*, while to some of them, most often to the red-hipped Humble-bee, it affords also a purple couch whereupon at drowsy evening, as in the fading time of year, we are sure almost to catch him napping. When the purple of the flowers has faded also, the head of a thistle remains still a tower of strength, for defence not alone of vegetable life: sometimes its bristling out-works may protect only its own seeds, but most often they enclose also an insect garrison, to which this bitter corn supplies provisions. Minute grubs and tiny caterpillars, bright scarlet and brownish white, thus live by thousands within the prickly calyx, till in

¹ *Cynthia Cardui*.

lieu of the seed and its feathery down, devoured and arrested, they themselves are seen floating through the air in the winged forms of downy Moth or glittering Fly.

For the most part, the wings of both sexes among Butterflies are adorned alike, but sometimes, as with the feathered race, there is a difference clearly not to the lady's advantage, in the painting of her pigmy plumes. The pretty Orange-Tip,¹ that well-known sporter amidst sylvan glades and meadows, has at home occasionally beside him a white-winged partner, bearing his name, but without a colour of pretension to the title. The brilliant blue of our little Argus, of fighting celebrity, is deepened in his lady to a purplish brown; while the bright yellow of the Brimstone beau² fades in his modest belle to a greenish white.

Perhaps in the whole range of nature there is no object of equal size which presents so much combined splendour, variety, and elegance, as a Butterfly's wing,

"Where colours blend in ever varying dye,
And wanton in their gay exchanges vie."

Its richness of hue and velvety softness of texture are produced by the seeming powder, in reality minute feathers or scales, sometimes intermixed with hairs, by which it is thickly overlaid in the manner of a roof with tiles. The number of these little plumes is immense, yet hardly so prodigious as the patience of certain Entomologists, who having counted, found them on the wing of a Silk-worm Moth to amount to 400,000; while as many as 100,735 were found comprised within a single square inch of that of a Peacock Butterfly. When stripped of its plumage, the wing, as all must have noticed, is left a thin transparent membrane, intersected by nervures and dotted with little holes wherein the plumelets were inserted. In a few instances (chiefly in tropical insects) spots are left by nature perfectly transparent, contrasting prettily with the rich velvet which surrounds them.

¹ *Pontia cardamines*.

² *Gonapterix rhamni*

Several tribes of our native Butterflies are distinguished and classed according to their prevailing colours. Our fulgid Coppers,¹ and Fritillaries² with silver-spotted wings, look allied by their metallic lustre with the metallic productions of earth. Our Blues³ imitate the azure tints of the sky, while others which display shades of light, progressively warming from white to orange, have been considered not unaptly as "sacred to the day." Those concentric circles of colour, called *ocelli* or eyes, which give, in some instances, such an accession of life and brilliancy to the wings of Butterflies and Moths, may be looked on as stars of distinction belonging to their order (*Lepidoptera*), conferred solely on one other of the insect race,⁴ and eclipsed only by the magnitude and profusion of those which are lavished on the strutting peacock.

¹ *Lycæna*.² *Melitæa*.³ *Polyommatus*.⁴ The *Orthoptera*.

'In her hours of supposed privacy'



This vignette represents the transformations of the Lady-bird (*Coccinella*). On the large hop-leaf, which occupies the foreground, is a group of eggs; near them, to the left, a grub or larva, devouring a hop aphid; again, to the left, attached to a stalk, is the pupa. Higher, on the right, is a perfect Lady-bird (*C. septem-punctata*), of which genus two other species are figured, one in flight, the other on a stalk.

THE LADY-BIRD OF OUR CHILDHOOD.



ANY who exterminate Spiders as a matter of merit, crush Earwigs without remorse, and hold *Black-Beetles* in abhorrence, look with involuntary kindness on the little *Red-Beetle*, styled a Lady-bird. For this especial favour she stands indebted partly to her pretty spotted gown, and partly to her being associated with the earliest recollections of

our childhood. A word or two, *en passant*, on Nursery Rhymes, on that one at least which is pertinent to our subject—

“ Lady-bird! Lady-bird! fly away home,
Your house is on fire, and your children alone!”

Now, in reality, instead of flying to the rescue of her own innocents, her business is most probably to murder and devour a score of other innocents, clustered together on a hop or rose-leaf; or, in other words, to make a luscious meal of *Aphides* or Honey-dew Insects, of whom her Lady-birdship is exceedingly fond—fond as a wolf of a flock of sheep.

Let us begin with the beginning of the Lady-bird's life, even from its commencement in the egg-shell. The eggs are of a bright yellow, small, flat, and oval; and, laid close together in patches of a score and upwards, are to be found throughout the spring and summer, glued to a variety of leaves. It must not be imagined, however, that the mother insect by whom they are thus deposited is ever so regardless of the welfare of her family as to commit it, while in embryo, to the barren surface of the first leaf falling in her way. Carnivorous herself, she takes care that her children, when the sun wakes them into life with similar but yet more devouring propensities than her own, shall have abundance of living food for their exercise conveniently at hand; and for this purpose she fails not to select as their nursery a leaf, most frequently of rose-bush, hop, or honeysuckle, but of what sort soever, one sure to be peopled by, or closely contiguous to, the insect live-stock so essential to their support.

It is in this its earliest stage of grub or *larva*—the most voracious if not the most active of its life—that the *Coccinella* plays its most important part in the reduction of the *Aphis* million, both in gardens and hop grounds, where the latter is popularly known as “ the Fly.”

The second shape which the Lady-bird pu's on is that of the *pupa*, correspondent to the *aurelia* or chrysalis of a Butterfly.

To know what is the form then assumed, our readers would do best to seek it on the above-named plants, where, after a previous glance at our figure, they will be at no loss to discover the original. As for the history of our Lady-bird's life, in this its second epoch, a few words suffice, because it is that in which there is very little life about it. Having, in a few weeks, gorged as a grub her fill of *Aphides*, she fixes herself by a sort of natural glue, either to a stalk or to the under surface of the leaf which has served the purpose of pasturing her devoured flock. Thus secured from falling, she puts off the pupa skin with the limbs which were requisite to obtain her prey; and then, in a form of outward inactivity, bides the time until by inward working and expansion she has arrived at the perfection of her nature.

The Lady-bird mature is still, as in early life, a feeder on *Aphides*, and she is for ever to be observed in the carnivorous act of their destruction. It is said, however, that her voracity decreases with her age, and that instead of pursuing her prey (as when a grub) into the narrow folds of a leaf or retired recesses of a bud, she is content to victimize the open feeders within her more convenient reach.

THE CAGED LADY-BIRDS.

A FRAGMENT.

HAVING given the natural history of the Lady-bird, we will narrate a short "record of the heart," in which one of these parti-coloured favourites of childhood happened to play a more than usually important part. We picked up the story in the course of a ramble for the purpose of collecting insects.

One evening last June, as we were strolling in the neighbourhood of Highgate, wholly occupied in examination of the hedges beside us, and never thinking of a heavy thunder-cloud behind, which hung threateningly over the sun-lit spires of the

metropolis, a huge rain-drop, spreading to half-crown diameter, suddenly darkened the dust at our feet. The fall from the clouds of the coin itself could scarcely have surprised us more. Down came a second—then patter—patter—a hundred more, from which it was high time to seek escape. But how! Ours was no high-way, but a bye-way; there was only one solitary cottage which stood a few yards distant: but that to our comfort had a porch, within which we were presently ensconced. Yet as the torrents continued to descend, we soon found our place of refuge less secure than we had deemed it. The porch was merely a rough trellis thickly covered with clematis, and as the creeper got gradually soaked, its yielding branches falling inwards, served only as conductors of the dripping deluge. Here we would take occasion to observe how a favourite pursuit may serve in some sort as a shield against annoyance and impatience; for even while our sorry shelter was each moment lessening, we could not but admire the gnats that were dancing up and down between the rain-drops. We were not, however, so entirely engrossed by thinking of the midges' wondrous preservation as to be quite regardless of our own predicament, and now halted, in our shower-bath, between the two more active measures of running desperately through the torrent before us, or of invading the peace of the cottage in our rear. Our mind was made up to adopt the latter alternative, and a hand was already stretched towards the little black knocker, when—the door opened and a tall thin old man, in appearance what has been called the shabby-genteel, invited us to enter, with a courteous expression of regret at not having seen us sooner. Having stood long enough already, we did not stand on ceremony, but stepping over the door-sill, found ourselves, at once, in a snug little front parlour. The charity of our good Samaritan did not stop here, for taking down from a convenient peg a long grey threadbare coat, he insisted on our exchanging for it our own dripping garment which he carried, himself, to dry at his kitchen fire.

When, in pursuance of this hospitable purpose, the old gentleman had unsuspectingly shut the door upon us, we took an honest survey of the room; in a strange apartment no uncommon procedure, often affording at a glance some considerable insight into its occupant's pursuits and character. Flanking the watch-tower on the mantle-shelf was a profusion of shells, in the midst of which, like monsters of the deep, grinned, on each side one, a pair of corpulent Chinese bonzes. Perhaps our friend, in his youth, had "occupied his business in great waters." One thing was evident—there were no women-kind about the good man's house: not a work-basket, a pair of scissors, a nutmeg-grater, or even a thread on the carpet to indicate female occupancy. The old man must be a bachelor;—but no,—over the fire-place hung a portrait, and a very good one, of a pretty woman in the dress of a lady some forty years ago, and below it the miniature of a sweet little girl, whose innocence looked out of a pair of large blue eyes, cut exactly after the same pattern as those of the elder portrait. No doubt then he was a widower. So far satisfied, we turned our eyes towards the window to see how long we were likely to encroach on his hospitality—and then first noticed in the window-seat a square glass case, raised by some books to bring it on a level with the light. It was roofed with gauze and floored with wet sand, wherein was stuck a branch from a white rose-bush, which we perceived, on looking closer, to be peopled by some half-dozen of large Lady-birds. The insects were almost too many to be there by accident: the rose-branch, too, was well furnished with *Aphides*, their favourite fare, and seemed therefore as if chosen expressly for their accommodation. The glass case was certainly then a cage for Lady-birds, and the old gentleman must be, it followed, a brother entomologist. We had just arrived at this conclusion when the parlour door re-opened and in came our stranger friend, followed by a Hebe in curl-papers, bearing on a tea-tray a smoking jug, a pint bottle, and two capacious goblets of different shapes and sizes. "The gentle-

man must take something warm as an antidote against taking cold."

During the process of compounding the elements, and before the starting of another subject, we pointed to the glass-case. "No doubt, Sir, an entomologist?" A shake of the head overset at once our previous conclusion.—"Beg pardon, Sir, —I thought from that, that like myself you were fond of studying the habits of Insects: but most likely you have some little friend—perhaps some favourite grandchild, for whose amusement,"—"No," said the old gentleman, "no—I have no one—I am a solitary old man.—But indeed, Sir," he added with a melancholy smile, "you are not the first who has wondered at my foolish fancy for keeping those little creatures. Some, I dare say, have set it down as the amusement of my second childhood; and,—God help me!—perhaps they are not far wrong."

We were sorry to have touched upon what was at all events a tender theme in return for the good man's kindness: and though our curiosity concerning the petted Lady-birds was whetted rather than allayed, we took care to say nothing more about them, and, fearing to commit a double error, forbore all notice of the portraits. After an hour's sitting, our well-dried coat was resumed and we rose to depart.

Our first visit to Providence Cottage led to many more, in the course of which the old gentleman opened to us much of his heart and history. He related to us, by snatches, a common tale.—He told us of losses in trade—loss of health—loss of an affectionate devoted wife, one who for love of him had left a higher station, and never by look, word, or deed reminded him of the sacrifice. But chiefly did he speak of one beloved child who, when wealth and health and wife were gone, stood him for awhile instead of all.—Of this child only, and only of her as connected with the caged Lady-birds, shall we repeat a part of his relation. In her seventh year she,—his little Rachel,—was seized by severe illness, through which her

heart-stricken father was her sole and constant nurse. If he had possessed the means, no hireling would he have paid to tend his darling child : but he was poor, and thus poverty and will met for once in sweet consent.

On the morning of the fourth day after her attack, the restless uneasiness of the little sufferer subsided into a deep and quiet slumber. The tired watcher, who, while fatigue and despair together weighed down his broken spirit, had found it hard to resist the drowsiness of exhausted nature, was roused to trembling wakefulness by the flutter of hope within his heart. He knelt beside the bed—" Oh ! let not this blessed hope prove a mere delusion. Save, merciful God, my only treasure ! or if——." The weakness of the flesh forbade to express in words the dread alternative, but with head bowed low, the father remained for a few moments in an attitude, at least, of resignation. When he rose from his knees, the rush-light had expired and a ray of bright sunshine, entering at the round hole in the shutter, fell upon the slumberer's features, which were still composed in quiet rest. Poor Gregory drew the window-curtain quite close ; then quitted the chamber and descended to the garden. The air refreshed his throbbing temples ; but, chilled by his night vigil, the morning sun, as it glistened on the dew-drops, seemed to impart no warmth to his benumbed frame, and no good augury to his trembling heart. Before the sun goes down (thought he),—and fearing he scarce knew what each moment he was absent from his post, he hastened to resume it, but not till he had hastily plucked a little bunch of flowers. But one day previous he would not have dared to gather them, to decorate the sick chamber, then most likely to become, ere night, the chamber of death ; but now there was hope, at least, in that quiet slumber. It had not been broken when the father returned, but in a few moments the sleeper's eyes opened, and, as if the intense affection of her parent's gaze had been felt even through the closed lids, turned directly towards the fond anxious face beside her.

"I've brought my Rachel a pretty nosegay," said he, as he stooped forward to kiss her, and laid the flowers on the coverlid. The child, grasping them in her little thin fingers, raised them to her faded face.

"Stay, darling, there's a Lady-bird on that white rose, let me put it out."

"Oh, pretty Lady-bird!" cried the little girl, her large sunken eyes lighting up for a moment with childish delight. "No, let me keep it, only all to-day; and to-morrow I'll take it out myself, and bid it fly away home, as poor mamma so often told me."

"But suppose it should please to fly away to-day, how can my little Rachel help it?"

"Oh, I'll put it in a box, and give it nice green leaves, as many as it can eat, and——"

Poor Rachel's voice was not strong enough to complete the list of luxuries she would have promised her prisoner in lieu of liberty; but, as if already bribed to quietude, the insect, which had hitherto been describing circles round the rose, stood still near its centre. Delighted to find his little nurseling well enough (for the first time in four days) to notice and seem amused by anything, the father separated the white rose from the other flowers, and placing it on a table at the foot of the bed, inverted a tumbler over it.

"There, sweet one," said he, "your Lady-bird is safe." The child was satisfied, and went to sleep again, thinking of her pleasure in letting it fly to-morrow.

When that morrow came, no daylight was allowed to penetrate through the darkened window of the chamber where the Lady-bird still occupied its crystal prison, for the little child who was to have bid it fly—her innocent spirit had taken its own flight home.

* * * * *

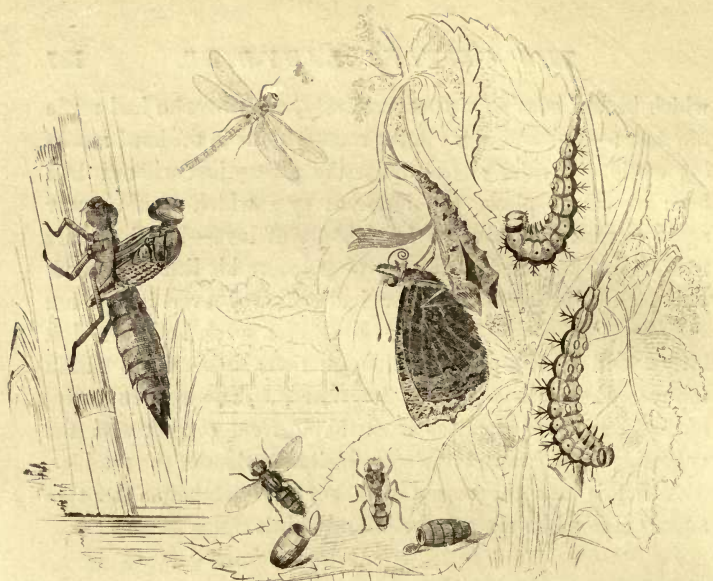
The funeral was over: the chief—the only mourner, stood in the unwelcome daylight just admitted, beside the bed on

which he had seen depart, successively, the two who had made life dear :—he stood alone in the room—alone in the hard mocking world. On the table—under the glass—just where it had been placed to please the innocent eyes which would never again reward with a smile his labours of love—lay the white rose he had gathered on the morning before his little one died. For lack of water the flower had withered even before her cheek was cold, and now the lapse of a week had turned it brown and shrivelled. But though there was no life within the rose, there was life about it—near it. The captive Lady-bird still survived ; and as if shrinking from contact with the vegetable death, was traversing uneasily the sides of the tumbler.

And this was the reason why our old gentleman kept in a glass case white roses and red Lady-birds.



No doubt Sir an Entomologist ?



Insects of three several orders are here depicted as emerged, or emerging from their pupa cases. On the right, are two caterpillars of the small Tortoiseshell Butterfly (*Vanessa Urticae*), suspended to the stalks of nettles for their second transformation. They are hung pendent by means of hooks passing through silken loops woven to the stalks; and through the skin of the lowest, which is rent at the shoulders, appears the head of the emerging chrysalis, or pupa. To the left of these, and suspended in like manner, hangs the chrysalis itself, or, more properly, its empty skin, on which, recently come forth, stands the Butterfly, with wings hung down for more complete expansion. On the nettle-leaf below, are two empty, barrel-shaped pupa cases of flies, sometimes parasitic on the same caterpillars; of these, one is prepared for flight, while the other, more recently emerged, appears with wings still damp, white, and crumpled. To the left, on a stalk of mare's tail (*Equisetum*), is the pupa of a Dragon-Fly (*Æschna varia*), from whence, through a rent on the shoulders, the perfect insect is "coming out." One emerged appears on wing at a distance in pursuit of its butterfly prey.

COMING OUT.



LD MAY DAY.—Now is May arrived in earnest—the real flowering May of the Old Style and the old Poets; when kings and queens were wont to “come out,” and meet, as they went a Maying; all the more glorious things “come out” too, and “coming out” still, bright and beautiful as ever, now that of all these royal personages even the old bones are crumbled into dust.

“Coming out!” what a multitude of pleasant notions are associated with this expression—the very motto for the season, now inscribed in living characters on the unfolding scroll of nature. Who can want an exhortation to “come out” and read it?

Not the flaxen-headed village children, who “coming out” of school, hie shouting to the wood and meadow, where they spell it (each after his fashion) with a merry laugh.

Not the captives set free,—be it from durance, from disease, or labour. These from the dark-barred prison—from the close sick chamber,—from the fœtid factory “coming out” themselves, all read the bright inscription in the glorious sunshine—in the free fresh air,—in the opening flowers:—read it with eyes that glisten, and hearts that, if not crushed entirely, expand with gratitude and joy.

And other “comings out” are in progress, which, as compared with these, are cold, conventional and artificial—yet not without a something, in their way, of seasonable light and gaiety and promise. Of such are the “coming out” of new books—of new actors—of fair new flowers, not of the garden or the wild, but of the world,

“ With eyes
That mock the hazel-nut and shame the violet.”

Last, not least, in eyes like these, are the fashions, “coming

out" for summer "with the butterflies;" a phrase which brings us back to the sweet natural, and gives occasion to look more closely than our wont into some of those expansive processes by which the youthful flutterers of summer are "finished" for their "coming out" in the gay assemblies of the insect world.

Now day by day do the garlands which adorn their verdant ball-rooms grow thicker with opening flowers, and together with these, and emerging in numbers nicely proportioned, do

" Throngs of insects in the shade
Try their thin wings, and dance in the warm beams
That waked them into life."

We are thus reminded, at every step, that flower, leaf, and insect, were intended for each other; a fact already noticed, together with various other analogies between their respective "comings out."

It is no easy matter, watch it as we may, to see a flower in the act of blowing—bursting from forth the confining calyx; nor is it much less difficult (out of doors) to catch an insect in the act of emergence from the trammels of its chrysalis estate. It needs, however, but small pains and patience, which will be well rewarded; to become witnesses, within doors, of the latter operation. This with a variety of insects is equally curious and interesting, though most conspicuous and easy of observation with the tribe of Butterflies and Moths.

Numerous Cabbage Butterflies, both of the larger and smaller species, have "come out" already, and are now upon the wing; but as of these there are various successive broods, there are almost as many still enwrapped in the skins of their angular chrysalides, and hung pendent, horizontally, in their chosen places of security,—such as under the copings and ledges of garden walls and palings.¹ We have only to lay gentle hands on a few of these seeming sleepers, and carefully

¹ Vignette to 'Life in Death.'

detaching with a knife their silken buttons of suspension, to stick them by the same, with a thread girth round the body, to the upper edge of a deep-sided box; then placing this beside us on the table, we shall hardly fail by an occasional glance to have our curiosity gratified in their emergence under our own eyes.

We must remember that, like the embryo of a plant in the seed, or the rudiments of a leaf or flower in the bud, the various parts of the butterfly have been pre-existent even in the caterpillar; and when these are arrived at their full maturity within their chrysalis cover, then approaches the crisis of emergence. At this period there takes place a violent agitation in the fluids of the insect,¹ by which they are driven from the internal vessels into all the tubes and nervures of the wings, which being at the same time filled with air from the wind-pipe, increase considerably in size. This, added to the restless motion of the legs, soon enables the imprisoned creature to burst its enshrouding skin, which, flying open at the back, discloses, the head and shoulder of the butterfly. Being then soon released entirely, it stands for awhile, motionless, on the broken fragments of its late prison—its wings damp and drooping, small and crumpled; but distended by the fresh supply of air, inhaled through the spiracles, they expand so rapidly, that in the space of a few minutes their dimensions are increased *five-fold*!

Directly after emergence, the wings are thick, and capable of great extension by stretching, but not so after full expansion; neither do butterflies or other winged insects ever grow, when they have once attained their perfect form.

Besides that of the common White, or Cabbage,² the coming out of the small Tortoiseshell Butterfly,³ may also now or early in June be easily observed. The gilded chrysalides of this also common but very beautiful insect, are now, and again in August, to be found almost everywhere, suspended head downwards,

¹ Insect Transformations.

² *Pontia brassica*, &c.

³ *Vanessa urtica*.

either to the stalks of nettles whereon their caterpillars have subsisted, or upon adjacent walls and palings. By detaching carefully, then re-suspending them in their natural position, we shall be able to observe, at home and at leisure, the exclusion of their richly-coloured pinions from the gilded cases which look not unworthy to enclose them. Or if we choose to follow them through their two-fold transformations, thereby procuring to ourselves a two-fold pleasure, it is now easy to collect and keep some half-dozen of the caterpillars themselves, of which the younger broods are still feeding in company on the nettle. They are black and green, black-headed, and spiny coated.

The "coming out" of Moths bears a general resemblance to that of Butterflies, only that owing to the chrysalides of the former being usually enveloped in a cocoon, or outer covering, they have not only to burst from their aurelian skin, but also to effect their egress through a barrier, sometimes of silk only, but often fortified by much harder material. The Caterpillar of the Great Goat-Moth (or *Cossus*),¹ a dweller within the interior of oaks and willows, on the wood of which it is a feeder, constructs itself a compact cell or case, of materials nearly similar to those employed by the Puss¹—namely wood, reduced partly by decay, partly by its own jaws, to the resemblance of saw-dust. With this, bound together by silk, and cemented by glue, it usually composes the exterior of its case, which is lined also by a silken web.

Our exploration of a hollow willow-tree was rewarded, at the beginning of last August, by the discovery of such a cell,² (an oval, wood-covered cocoon, two inches and a half long), from whence, in a few days, we had the infinite satisfaction of beholding its inhabitant come forth. The first intimation of the approaching event was a strange shaking of the solid fabric; and presently, by dint, as it would seem, of violent efforts, and the use of its hard bulky head as a battering-ram against its prison wall, the creature, still elad in chrysalis mail,

¹ Frontispiece.

² Vignette to 'Moths as Operatives.'

effected a breach at one end of the oval cell. Be it here noticed that the rings of this Goat-Moth chrysalis are each edged by a fringe of hook-like appendages, and now observe their use. Grappling by these, it is enabled to push its brown shining body half way out of its case, in the aperture of which it remains then firmly fixed. In this position, supported by its wooden walls, comes the crisis of its final change. The glazed back-piece of the aurelian mail bursts asunder at the shoulders, and through the rent, slowly advancing, comes out a gigantic brown-winged Moth¹—the perfect form of three years' development.

The last emergence of various Dragon-Flies, may, during a great part of summer, be often witnessed, by inspecting the stems of aquatic plants, to which they fix themselves on leaving the water, (where their earlier stages have been passed) and attached to which they are accustomed to leave their pupa skins, after having come out as tenants of the air.² Last summer, whilst awaiting the appearance of the small Tortoiseshell butterflies above mentioned, from several of their chrysalides, we gained an opportunity of observing, not only the coming out of the insects expected, but that also of others, which in the character of parasites had been surreptitiously introduced. One chrysalis out of five was full of small Ichneumons, while two others contained, each, several of the brown oval pupæ of a species of Fly, nearly resembling the common frequenter of our houses. Of these and the like parasitic invaders—of their modes of getting in, as well as of coming out, more at a future season.

While the book of nature, as a mere natural history (whether relating to insects or other things) was almost, perhaps, a sealed volume, the "coming out" of the butterfly had attracted notice, and been hailed as a symbolic promise that man also was to "come out," in due time, from the darkness of the grave. The same Greek word *PSYCHE* was applied to

¹ Frontispiece.

² Vignette.

denote both a *Butterfly* and the human *Soul*; hence (say the learned) the Egyptian fable of Cupid and Psyche, and the reason that in Grecian sculptures Psyche is so often represented as subject to Cupid, either under the form of a butterfly or adorned with the wings of that most glorious of insect flutters.

When life and immortality were brought to light by the Gospel, the insect type by which, in the midst of Pagan obscurity, they had been dimly shadowed forth, acquired fresh illumination. Employed by the Fathers of the Church, the beautiful symbol of the Butterfly shone on their ponderous pages like a beam of sun-light, falling through a painted window on the gloom of a cloister. So great, indeed, was the value attached to this insect emblem by writers for the Church, in the time of Réaumur, that they absolutely fought for it with that great and good naturalist, because, with his newly-acquired light on its natural history, he saw reason to dispute the entire fitness of insect transformation to represent the mystery of human resurrection. And certainly, when it came to be ascertained, by the experiments of Réaumur and others, that a caterpillar is not in fact a simple but a compound animal, containing within it the rudiments of the future butterfly in all its parts, it ceased to be an exact parallel of the usual idea of the resurrection.

Although the Butterfly seems to have been the first, if not the only insect noticed by the ancients as representative of the immortal principle, there are a multitude of others which furnish emblems quite as fitting of the soul's destination to a higher sphere.

The fly, now regaling upon sweets, or buzzing in the summer sun, has come out from a shape, and most likely from a substance, of disgust. The beetle, now careering it through the summer evening sky, has emerged from the form of an unsightly grub, and from a living burial within the earth. And the gnat, now a graceful and agile sporter in the air, has

issued from perhaps a horse-pond, where it dwelt an hour ago—a miniature monster of the mimic deep.


Thus by plain and pleasant symbols is Nature for ever teaching us—entreating us to come out and sit with her at the feet of her Great Author. Her “tongues in the running brooks” are always tuneful; her “sermons in stones” never rugged; her “good in everything” is always easy of extraction; and her moralities are not adorned merely—but wholly conveyed by picture and parabolic story. The French Fabulist observes with truth, that

“La morale nue apporte de l’ennui,
La conte fait passer le précepte avec lui.”

But though Nature deals with us, her children, on this very principle, we turn a deaf ear to “the voice of the charmer,”—and while the Thousand and One Nights of the far-famed Scherezade are in everybody’s memory, the 365 days of the year, each with its tale within tale of wonders ever new, go round unheeded or unheard.

THE BARON AND THE BUTTERFLY.

A TALE.

 HERE lived, in the feudal times, a powerful baron, who wasted his patrimony and stripped his wretched serfs to feed his appetites. He was like a great caterpillar, turning green leaves into brown skeletons in order to fill his ravenous maw.

Like most great caterpillars, and most great men, he was infested by greedy parasites; yet amongst the members of his household there happened, by a strange accident, to be one honest dependant, who, by a stranger still, was a priest—the baron’s chaplain and ghostly adviser.

The mere sight of him was enough to remind people of their

souls ; but, however this might have been with those about him, it is certain that the Good Father never forgot that he had a soul himself ; and, what was more, he thought about the souls of other people, especially about that of his patron. He had long, indeed, entertained misgivings on account of that precious jewel,—but great, nevertheless, was his horror on discovering, one day, that the baron, though a Catholic in all outward observances, was (in those days a thing wonderful as horrible) an unbeliever.

Piercing swords from the word,—leaden bullets from the Fathers,—threatening thunderbolts from Rome,—all were at the holy man's disposal, and boldly and zealously did he ply these sacred weapons for the ejection of his patron's spiritual foes ; but they still keep fast possession of the baron's soul : and the baron (as well he might) swore that he had not a soul to keep.

But Providence appoints its own means as well as its own times and seasons.

The baron fell sick : his breast heaved with the throes of his fiery and troubled spirit. Now, good Father Ambrose, now is thy time—now if ever—to aid in the rescue of thy patron from the power of the enemy. Well he knows it, and there he stands beside the baron's bed, which fever of body, fever of mind, and fever heat (for it was a sultry August noon) had converted into a sea of molten lava.

“Talk not to me, father !—If there was a heaven such as your idle words describe it, St. Boniface defend me,” (the baron, though he scoffed at God and the Devil, was always calling on his patron saint)—“St. Boniface defend me from such a place !—No horse—no hound—no hawk—no venison pasty—no garnished boar's head—no Rhenish wine.—Call ye this heaven ?—To sit upon a cloud, and sing *Aves*, like a beardless chorister !—A heaven for a *man* ! By my spurs, it were a fitter for yonder Butterfly.”

“Stay, my good lord,” said the monk, eagerly catching his

patron's hand in one of his own, while he pointed with the other to the large White Butterfly, which had just entered the window; "you talk, my lord, of that Butterfly—in scorn; but know that the Butterfly is heaven's own emblem of the immortal soul!"

The baron awoke next morning with calmer pulse, and in calmer mood than usual. The leech exulted in the success of his remedies, and as he retired from his morning visit pressed the rushes on the floor of the chamber with audible tread. The Physician of souls also welcomed the patient's clearer brow and softened tone; but, more modest than his brother in the art of healing, took no credit to himself for the smoothing of the troubled waters; and fearing the calm would prove but transient, forbore to ruffle it by the renewed breathing of his ardent spirit. He therefore stood beside the bed in silence, watching and ministering, even with woman's tenderness, to the sick man's wants.

"Ambrose," said the baron, as he took from his hand some cooling drink, "I have been dreaming something—I hardly know what, of that Butterfly heaven of yours; only I just remember that I saw there (in sooth it was a foolish fancy) my brother Hubert."

"And wherefore not, my lord? Thy brother Hubert was a good gentleman—and, God rest his soul! a pious christian,—also, a noble benefactor to our ancient house."

"Aye! father, but he loved a venison pasty, and a stoup of good Rhenish almost as well as—his sinful brother."

"True; but these creature comforts, with other carnal lusts, were not the gods of his idolatry, as——"

"They have been of mine, Good Ambrose, you would say; but they are broken—broken—now, and so is their worshipper.——Do you know, Ambrose, I would give—but, fool that I am! what have I left to give—to have been another man?"

"My dear patron! my brother in Christ!" exclaimed the monk, falling on his knees, and grasping the baron's hand in

ecstasy, "be then no longer what you are——But what say I? the Spirit's influence has already begun—and *you*, while it is time, must work with it to complete a change."

"The time is past; or, if I had years instead of hours, did you not once tell me—no, I learnt it from my mother when I was a little child—that 'the leopard could not change his spots, nor the Ethiop his skin.'"

"Aye! but I also told you yesterday that the Butterfly is an emblem—an image of the soul—*your* soul. The Butterfly was once a crawling greedy caterpillar—his world the heart of a cabbage."

* * * * *

"The devil fell sick—the devil a monk would be;
The devil got well—the devil a monk was he."

The baron got well; but his penitence did not exactly evaporate in a whiff of brimstone, as is here recorded concerning that of his late master.

One day, while leaning, in his walk, on the arm of Ambrose, a thought—a clever one as he believed it—entered the convalescent's head.

"Father," said he, "what would have become of all these flying creatures, if when, as you tell me, they were crawling caterpillars, they had not eaten their fill? Methinks their bravery would have been finely clipped. See, some of them are bigger than the others,—those, I warrant, who had a place nearest to the cabbage heart. If your comparison held good, the more a man indulged his carnal appetites, the better angel he would make."

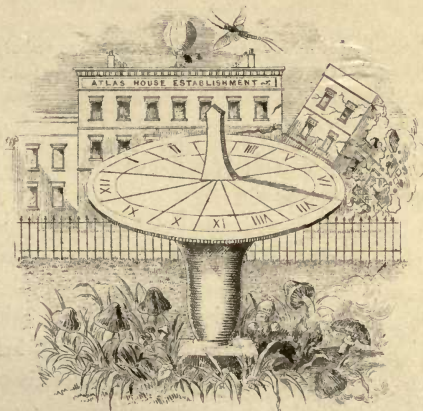
"Satan, avaunt!" inwardly exclaimed the holy man, shocked at the irreverent idea—"thou speakest as if the carnal man were in reality a caterpillar, with no better teaching than his own craving appetites—the immortal spirit really a short-lived Butterfly. Did I not explain how these are only emblems? But, even thus considered, thy objection is but vain. Perhaps thou

knowest not (and here my teaching was in fault) that no Butterfly ever yet issued from a caterpillar's skin—no crawling worm ever yet changed, at once, into a glorious flutterer. The greedy caterpillar must put off, first, his gross and grovelling nature; his sensual delights of cabbage or of nettle must become to him as nothing."

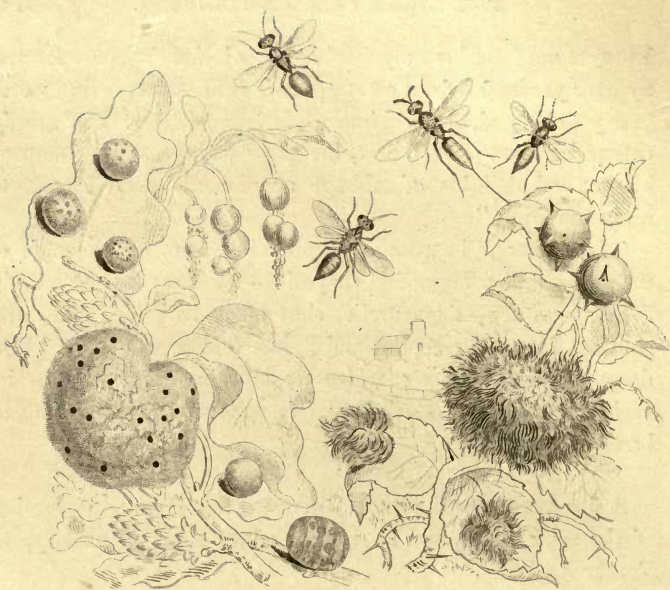
"Look here," he continued, plucking from off an angle of the castle wall a suspended chrysalis—"look at this seemingly lifeless creature—this aurelia, shut up in its gilded skin, and shut out from the creeping and flying things around it. You deem it dead; but its energies are now in fullest action,—its various parts are maturing, and it will soon join its winged brethren in the sky.

* * * * *

A few years saw the baron converted into a reverend brother of the same order, and an inmate of the same monastery, as Father Ambrose.



"These stand their purposed day"



The transformations of a May- or Day-Fly (*Ephemera vulgata*), form the subject of this vignette. On the bank is the grub or larva, with the nest-holes, usually below water, which it is accustomed to inhabit. Attached to the grass above is a vacated skin, the complete envelope of a perfect fly, which it always casts off on its fourth or last development. To the right, flies an imago, or perfect insect, as freed from this incasement, while a company of the same are seen disporting at a distance.

THINGS OF A DAY.



WE are no advocate, through thick and thin, for "the Good Old Times," into which we should be sorry to find ourselves carried back in other than on the wings of Fancy; but, few enough, in these days, are the things made or done with a view to other than a temporary purpose, and for this reason all our doings (sorry bunglers as we are at best) are ten times more imperfect than they need be.

Look at that new street, in suburban London, called Atlas Place. Wanting strength to support their own weight, two of the end houses fell beneath the gales of last March. But what of this? They stood their intended *day*, for they were only built to sell, and were turned into money; they served to "raise the wind" before the wind razed them. In the centre of the row still stands Atlas House, a manufactory of boarding-school misses, from whence they are to be turned out, exquisitely polished. The polish, it is true, will lie but on the surface, soon to be rubbed off, instead of heightened, by the wear and tear of life. And who can expect it otherwise, knowing that the neat little articles "finished" at all such establishments are but plated goods, got up only to last their day, to pass with the unwary for sterling metal, and fetch above their value at the matrimonial mart?

In the house adjoining, at a front window——But stay! what have we here, just fallen upon the ledge of our own cottage casement? An Ephemeral or May-fly, one, doubtless, of the early swarm which we noticed at nine o'clock this morning rising and falling near the brook at the bottom of the garden. They were then just risen from the water, new-born into air, and into their perfect stage of being. Now it is scarce noon, yet of this, and of the greater number of its active fellows, the life is over. Literally, as proverbially, this is the creature of a day;—a day! say rather of a few brief hours; but only let us compare it with the works of art or artifice intended by us for a day's duration.

Here all is finish and perfection; for Nature metes not the quality of her workmanship by amount of time. Even amongst the beautiful and short-lived flowers some of the most beautiful of all are of all the briefest;—witness that flower of an hour the *Malva horaria*, the *Favonia*, the *Gum-cistus*, and the *Night-blowing Cereus*.

But now to examine more minutely our cloud-dropt insect specimen,

“ Extinguished—not decayed.”¹

Look at these four unequal wings, with nervures so delicately reticulate, resembling the finest lace, the meshes filled by yellowish grassy membrane, and “freaked” with dark brown spots or squares. On the narrow chest, and long and flexible body, the same colours are harmoniously disposed in spots and rings, and even the three slender filaments which form the tail are ringed, *en suite*, with black and yellow, the whole being coloured by a natural varnish. How nicely jointed, also, and finely polished are the six tapering legs, of which the two foremost are much longer than the others, forming, when placed together and stretched forward, a sort of counterpoise in flight to the filaments of the tail. Besides the large compound eyes, which occupy a great portion of the head, we can just discern without a magnifier (and clearly with one) three shining spots disposed in a triangle close behind them. These are the ocelli or simple eyes, common to most other perfect insects.

And all this external beauty, with external organism yet more admirable, is intended but for the duration and uses of less than a single day! Fewer organs and far less adornment might seem, in our contracted judgment, to have sufficed for creatures designed during so short a time to employ the former, and to have the latter, in most cases, overlooked at least by human observers. Occasionally indeed, as we are now doing, we are led to amuse what we call an idle hour by bestowing a little more than our wonted notice on the more fleeting and fragile works of nature; and then, as we admire the elegance of form, the exquisite finish, the curious adaptation of parts, so strikingly if not pre-eminently observable in the flower or the insect of a day, there comes, mingled with our admiration, a feeling somewhat akin to wondering regret that so much pains should have been bestowed on the formation of an

¹ Vignette.

object intended to exist but for so short a space. "It's almost a pity! It's scarcely worth the while!"—are phrases which, rising to our lips, are checked only by the monstrous unfitness of applying them to the works of an infinite Being, with whom to will is to create, and to whom a day is as a thousand years,—a thousand years as a day.

Maternal instinct, wonderfully guided by Paternal Providence, directs each parent May-fly (heedless sporter as she seems) to drop her eggs into the water while she hovers above its surface. From each of these issues, in due time, a wingless six-legged grub,¹ which bears no resemblance to the perfect insect, except, perhaps, in the triple appendage of bristles issuing from the tail. The first care and labour of the larva's life is to excavate for its habitation, within the soft bank of the river, a hole or burrow, proportioned to its size, and below the level of the water, of which it is consequently always full. This cavernous abode serves the double purpose of protecting it from the jaws of its finny foes, and of providing it with a ready supply of that slimy earth on which it is supposed chiefly to subsist.²

In the above sub-merged, subterranean, sunless and earth-eating existence the streams of life and of its native current glide for four and twenty successive moons over the head of our as yet misnamed *Ephemera*, which, during the latter part of the same period, exchanges the first (or *Larva*) for the second (or *Pupa*) state of insect life. It is then that on some fine May morning (or may be evening) it bids adieu for ever to its dark subaqueous dwelling, and rises to the surface, prepared to enter on its third estate.

Having burst from the *Pupa* skin, which is left behind as the badge and bandage of an inferior and confined condition, it quits, in company with numerous fellows, the water for the air, in the shape, to all appearance, of a perfect fly. As if,

¹ Vignette.

² See Insect Architecture, p. 206.

however, the most fugacious of all insect forms was purposely designed to be also the most elaborately finished, it has still to pass through another and fourth stage of development. The singular process by which this additional and final change is effected has been thus described.¹

"After its release from the *Puparium*, and making use of its wings for flight often to a considerable distance, the little *Ephemera* fixes itself by its claws in a vertical position to some convenient object, and withdraws every part of the body, even legs and wings, from a thin pellicle which has enclosed them like a glove the fingers, and so exactly do the *exuviae*, which remain attached to the spot where the *Ephemera* has disrobed itself, retain their former figure, that I have more than once at first sight mistaken them for the perfect insect."

When thus adorned in their best and what may properly be called their bridal vestments, love and pleasure (unimpeded even by the exigences of hunger, air being then their only food) form the brief and brilliant consummation of their lives.

The seasons as well as hours of appearance vary with different sorts of *Ephemerae*, which are not therefore strictly May-flies. That figured in our plate is a large common species,² which we have noticed late in May, and early in June, sporting in groups of few or many, near the banks of the New River at Hornsey. Its most usual hours of appearance have been from seven till eleven in the morning, and from about sunset until dusk. We may here observe, that confinement, instead of abridging, would seem sometimes to prolong the existence of this short-lived creature; for of some of the above species put into a box, at night, several were found living in the morning.

Some of these insects appear in England even as late as

¹ By Kirby and Spence.

² *Ephemera vulgata*.

August; and Rennie speaks of having noticed them on the Rhine in the same month of 1829,—when appearing in the evening all were dead before sunrise. He describes them as “so thickly strewn in the great square at Wiesbaden, that it seemed as if a shower of snow had fallen in the night, their wings being white, and about the size of a broad snow-flake.”¹

The remarkable brevity of the *Ephemera*'s life seems to have attracted the notice of the ancients, Aristotle speaking of little animals on the river Hyparis which live but for a day:—those (he observes) among them which die at eight in the morning die in their youth; those which live to see five in the afternoon, in their old age.

¹ Insect Transformations. p. 316.



“See, Heaven’s own emblem of the Soul.”



This vignette is intended to represent the magical effects produced in vegetable growth by the punctures of various Gall-Flies. To the right, on the Briar Rose, are three of the moss-like galls termed Rose Bedeguars, each enclosing eggs or larvæ of the Producing Fly (*Cynips Rosæ*). The Gall-Fly itself is figured to the left, above; and the largest and most gaily-coloured insect of the four, also distinguished by a tail-like appendage, is a parasitic Ichneumon (*Calimone Bedeguaris*), as often as the true Gall-Fly an occupant of the Rose Bedeguars. On the rose-leaves above the moss-like tufts are two other galls, globular and spiny, produced by another *Cynips*, also figured above. To the left, on the branch of oak, are various fruit-like galls. The largest, full of perforations, is the common Oak-apple, when turned brown after exit, through these holes, of its Gall-Fly inhabitants (*Cynips Quercus*), one of which is represented in the centre of the Vignette. This and the other flies are considerably magnified. On the oak-leaves are several berry-shaped galls, green tinged with red, called leaf or currant galls, and nearly similar to those which hang in bunches from the catkins. Above and below the large Oak-apple, and proceeding from the branch, are two of the artichoke galls of the oak-bud. The excrescence, of somewhat oblong form and variegated colour, attached to a low branch in the centre of the foreground, was drawn from a specimen found amongst many others in Highgate Wood.

INSECT MAGICIANS.



THE day approaches on which oak-apples, bearing their gilded honours, will perpetuate the memory of those their ancestral fruits, which hung, in company with a hunted monarch, on the tree of Boscobel. Whether dressed in tinsel, or adorned by Nature's painting, these apples of royalty are pretty things to look at; and against the coming anniversary (the 29th of May), which will bring them within the reach of all, it may be worth inquiring whether they have aught within deserving notice; or whether, as with the merry monarch's self, they are to be estimated only for their outward bravery.

Pleasant to the taste these fair fruits are not (as well we know by bitter experiences of childhood); so not daring to bite, let us pull one of them asunder, or, dividing it with a knife, reveal its secrets. We now see, surrounded and bounded by spongy pulp, a set of cells, each with its solitary living occupant for whose safe keeping, and that of his fellows, this fruitlike tenement was called into existence, not by the labours of a trifling artificer, but by the touch of a flying fairy. The insect tenants of these pulpy palaces are not unlike, in one condition of their being, to the scions of royal houses. It is not improbable that before one of them has attained to the majority of its winged estate, all may be despoiled of their inheritance by a host of usurping parasites, such as, in palaces reared by hands, have often enacted a resembling part.

The above description of a common oak-apple, its Gall-fly occupant, and Ichneumon intruder, may seem over-fanciful; but in writing of Galls, our pen may possibly be carried from the dry land of simple fact by some spirit of fiction in our ink,—an infusion, it is likely, of gall-nuts, the produce of the

East, the very region of romance. With graver pens than ours, Fancies would seem, indeed, to have been the very growth of Galls; for, descanting on their origin, an Italian entomologist,¹ an observant naturalist,—one who waged war, moreover, with Popular Fallacies,—imagined that Oak-apples and other Galls were animated, nay, brought into being by a soul—not an animal but a vegetative and sensitive soul—in the plant itself. To account for the mysterious entrance of life into the centre of an imperforate ball, he might just as well have adopted, and slightly modified to suit his purpose, the no less imaginative notion of some learned Jewish Rabbins, who believed, or, not believing, taught that human souls transmigrate after death into leaves and buds.

But a truce with fancy, and now for fact; or perhaps we should say rather for the probable instead of improbable conjectures to which the extraordinary birth of oak-galls, and galls in general, have given rise. One thing is clearly ascertained, namely, that their originator is none other than an insect,—the winged parent of the wingless grub, or *Larva*, which begins life within them; but *how* the slight puncture made by the mother fly upon a leaf, or stem, or bud, can produce, and that often in a few hours, the extraneous vegetable products which arise for its protection around the inserted egg, is still no little of a marvel and a mystery. The common oak-apple (as becomes instantly apparent on cutting one across) contains within its pulpy substance numerous oval cells, each enclosing a small grub, which in due season,—June usually, or July,—will issue forth a little four-winged insect, the image of its mother Gall-fly.² Such, at least, is the result, when the legitimate possessors of the apple are allowed to reach maturity; but, in spite of the protecting bulwark which Nature has thrown up around them, a parasitic invader, a brilliant fly of the usurping family *Ichneumon*,³ often detects the helpless dwellers in the

¹ Redi.² Vignette.³ Vignette.

apple, pierces with an instrument adapted for the purpose through the fleshy pulp, and depositing an egg within each of the Gall-fly's grubs, leaves them a prey to the cravings of her own. The latter, when arrived at maturity, emerge a set of winged impostors, which, besides having taken the lives and usurped the dwellings of the Gall-fly brood, have sometimes also, through error of observers, robbed them even of their name.

Besides the oak-apple, many other varieties of Gall (each the produce of a distinct species of *Cynips*) are found on the same tree. One of these is now common on the leaves. They are either single or in groups; are about the size of a currant, green, tinged with red, and serve each as a protecting globe to a single egg, or grub, which occupies a central cavity, surrounded by the juicy substance of the fruit. These berry-like productions are sometimes seen attached also to the oak catkins, pendant on which they are not unlike a half-plucked bunch of currants, from their resemblance to which they have been named Currant Galls.¹ Others, widely differing from the above in appearance, but of similar origin, are also very abundant on the oak, near the extremity of its branches. These, from their form, and the arrangement of the small leaflets which compose them, have been named after the artichoke, which they most resemble.²

Not only the most extreme and tender branches, but the rugged bark, the solid wood, the root even of the giant oak, is ready, at the touch of her wand-like piercers, to supply the fairy Gall-fly with those rapid and extraneous growths, which serve to protect her tender offspring. Most of these bark and root-galls have the appearance of brown, woody, irregular excrescences; but there are some which form a beautiful and striking contrast with the coarse substances from which they spring.

¹ Vignette.

² Vignette.

Several other of these curious productions of animal origin, but vegetable growth, have been found upon the English oak; but it is to the oaks of other lands, those chiefly of Asia Minor, that we are indebted for the Galls, which, exported from Smyrna and Aleppo, made a prime ingredient of our ink. Such as may be curious to look upon one of those fairy-like Oriental flies, whose tiny wands have assisted to feed their pens, perhaps also their purses and their pride, have only to buy and bruise some half dozen of the best blue galls, in one or more of which the perfect insect is almost certain to be found imbedded.

Various are the other trees, shrubs, and herbaceous plants which produce each their peculiar galls. As the towering oak is not too lofty, neither is the trailing ground-ivy¹ too lowly to escape the impost levied on its juices for the protection and support of Gall-fly infancy, which is also cradled on the branches of poplar, willow, rose, and broom. Very commonly met with on the leaves of the hedge-rose, in July and August, is a berry-shaped gall, nearly resembling the currant-gall of the oak. Like that, it is coloured much like an apple, usually advancing with age from paly-green to rosy and mellow red; but, instead of being always smooth, this miniature and mimic fruit often displays a sprinkling of short sharp thorns indicative of the character of its fostering, if not parent, stem.² Besides the above, the dog-rose is accustomed to display one of the most conspicuous and perhaps the very prettiest of all Gall-fly productions. This, which is often called the rose *Bedeguar*, wears the appearance of a mossy tuft, varying greatly in size and in colour from green to brilliant red.³ In some parts of England it is said to be known by the name of Robin's Pin-cushion (we suppose Robin Goodfellow's)—a term which would serve to designate its fairy-like formation. The creative piercer of the fairy insect is, on this occasion, usually applied

¹ The gall of the ground-ivy is produced by a Gall-gnat.

² Vignette.

³ Vignette.

to a branch, sometimes to the main stalk of a leaf. The plant obeys, as usual, the behest of the parent fly, and speedily puts forth its energies to cover the group of eggs committed to its care; but, instead of surrounding them by a fruit-like globule, it produces, for their protection, a fibrous spiny mass, shooting in clusters from the several cells which include, each, its life in embryo. It is justly observed, by Mr. Rennie, that "the prospective wisdom of this curious structure is admirable. The Bedeguar grubs live in their cells through the winter, and, as their domicile is usually on one of the highest branches, it must be exposed to every severity of the weather. But the close non-conducting warm mossy collection of bristles, with which it is surrounded, forms, for the soft tender grubs, a snug protection against the winter's cold; till, through the influence of the warmth of the succeeding summer, they undergo the final change into the winged state, preparatory to which they eat their way with their sharp mandibles through the walls of the little cells, which are then so hard as to be cut with difficulty by a knife."¹

The rightful possessors of this comfortable mass-covered hybernaculum are four-winged flies of no extraordinary beauty;² but amongst the usurpers, which frequently deprive them in infancy of life and lodging, are some splendid ichneumon parasites,³ which have been pronounced unrivalled for elegance of form and brilliancy of colour. Their bodies, resplendent with metallic hues,—gold and purple, green and blue, and their wings (also four) with iridescent lustre,—these insect gems, which want nothing but size to dazzle the admiring eye, are beautiful objects for the microscope, and are easily procurable by keeping some of the rose Bedeguars, gathered in autumn or in spring, until about June; when, if placed under a glass, the egress of their occupants, whether legitimate or surreptitious, may be conveniently observed.

¹ Insect Architecture.² Vignette.³ Vignette.

Besides the Gall-fly, properly so called, there are several other insects which cause by their punctures a variety of vegetable excrescences somewhat resembling those described. Amongst these are the thistle-fly,¹ gall-gnat,² a few minute beetles, and several sorts of *Aphides*.

As works of wonder, all the comparatively great effects which arise from these tiny causes are worthy of description, as well as notice; but they are too large and too varied for the little limits of our page. It remains, moreover, to complete our outline sketch of Insect Magicians by one or two of the most plausible conjectures, as to the manner in which their natural miracles are wrought through the prick of a needle, fit only for the fingers of Queen Mab.

The *Ovipositor*, or egg-inserting piercer, of the mother Gall-fly, is, in some instances, conspicuously long; in others, only partially visible, except on pressure, when it appears issuing from a sheath, in form of a small curved needle longer than the insect's body, wherein it is, however, rolled up by a curious internal apparatus. It is supposed, by Mr. Rennie,³ that "after the Gall-fly has made a puncture with this instrument, and pushed her egg into the hole, she covers it over with some adhesive gluten; or that the egg itself, as is usual among moths, &c, may be thus coated over. In either of these cases the gluten will prevent the sap that flows through the puncture from being scattered over the leaf, and wasted; and the sap, being thus confined to the space occupied by the eggs, will expand and force outward the pellicle of gluten that confines it; till, becoming thickened by evaporation and exposure to air, it at length shuts up the puncture, stops the further escape of the sap, and the process is completed." The above explanation is, however, only given as conjectural, and the one generally adopted by French naturalists is, that

¹ *Tephritis Cardui*.

² *Cecidomyia*.

³ Insect Architecture, pp. 371-3.

the gall tubercle is caused by irritation, in the same way, as an inflamed tumor in an animal body.

We have seen now that Galls, though common things, are things produced in no common way, and things involved still in a certain degree of mystery. On learning this, some of you, our friends, may be led perhaps to avail yourselves of the coming day of oak-apples, to look beneath their surface. If there be one of you accustomed to estimate Nature only by her economic uses,—one who has never thought of galls but as associate with ink, — of willows save as material for baskets,—of roses, save as ingredients of a *pot-pourri*,—what will you think, on finding that the oak, the willow, the briar-rose, are, even in their excrescences, the supporters of animated worlds? What can you think but that your own mind must have been limited within a little world indeed?—a world from which you will be as eager to emerge, as is the Gall-fly from its oak-apple.



“Oh most royal retribution!”



Two of the golden green Rose Chafer (*Cetonia aurata*), seeking their favourite repast of pollen in the heart of a Rose.

LOVE AMONG THE ROSES.



YOUNG ladies, and old, and ladies of a certain age, all of you who have propensities for petting, we can recommend to you a pet,—a novel sort of favourite. We will describe his person and his qualities. In figure, he is a model of miniature proportion, a match for the German Dwarfs, a rival of General Tom Thumb, and a contrast to many of his pigmy order, frightful in big-headedness, or bulk of limb. He is clad in a coat of mail, and his armour—how shall we describe it for lustre, taste, and finish? The finest suit that ever issued from the workshops of Milan, rich in the

most cunning inlay of gold or steel, would prove, if compared with it, a rude, unsightly piece of workmanship. On the back of the corslet, burnished green and gold are the prevailing hues, while in front, on breast-plate, cuisse, and gauntlet, the lustre of the precious metal is predominant, mingled with changeable reflections of purplish crimson. But description fails in doing justice to an array so brilliant. Let us proceed, therefore, to its owner's character and habits, which are in all respects consonant to his polished exterior. His gentleness is in unison with his beauty, and he is no less distinguished for taste and delicacy. No gross and greedy appetite defiles his form or nature; for nothing coarser than honey or the golden farina of flowers, moistened by the juice of fruits, makes up his table of regalement. He loves, while yet in freedom, to ride upon a sunbeam; but would be content, when once enthralled, to bask only in the sunshine and his mistress's smile,—to revel and to sleep upon a bed of roses. What think you, ladies, of this our candidate for your especial notice? In proper and euphonious parlance, '*Cetonia aurata*,' is the fitting appellation which he bears; but to you, probably, if already known at all, he is more familiar as 'a nasty beetle!'

Yes, it is thus, doubtless, that, blinded (as some are for their live-long day) by the morning mist of early prejudice, you have been led to miscall even that beautiful creature, the *Rose* or *Golden Chafer*; with a multitude of others scarcely less worthy of admiring notice.

We have now ourselves a pair of these pretty insects caged in an open-worked basket, with serious intent to test the extent of their longevity, said by Roësel to have reached, in an individual of his own keeping, to the term (for an insect patriarchal) of three years. As was done by the German naturalist, we supply our captives, in addition to their favourite roses, with fruit and sugared moistened bread,—a fare with which they seem by no means disposed to quarrel, any more than with each other,

and such excellent friends are they, as often (like an insect Helena and Hermia) to

“Have with their” *jaws* “sat working at one flower,”

or at the demolition of one strawberry.

Now if any of our fair friends should feel disposed to try for themselves the keeping of some of these “loves among the roses” they may lodge them, if they please, in a style of appropriate elegance. In the stead of a basket let them be provided with a round closely-wired cage, high enough to contain in its centre a branch of roses, and wide enough to admit of a surrounding bed of light earth or sand.

Well, but perhaps say you, when the last rose of summer is departed, and the last strawberry is gathered, what then will become of our rose-beetles? Why, for lack of summer flowers, the rose, the peony, and elder, they must content themselves with flowers of autumn, dahlia, marigold, and aster, and with autumn fruits, the plum and pear. But when winter comes in earnest? Then it is likely that, according to the usage of their out-door brethren, which retire for the season to chambers underground, your domesticated chafers may betake themselves, for the same, to the bed provided them. In the case, however (though this is not, we believe, in favour of their longevity), of their being roused to activity by the warmth of house or fire, a moistened fragment of our “staff of life” will suffice amply to support the light burthen of their vitality.

Taking a July ramble through the woods or lanes of some of our southern counties—Essex, Kent, and Hants especially—it is more than probable that we may fall in with a gigantic forester, clad from top to toe in blackish mail, with head broader than his shoulders, and jaws, armed with formidable teeth, longer than his head.

“Oh! the horrifying monster!” exclaims, with a shudder, one of our lady-readers. “You can never, Mr. Cricket, intend to add a Caliban like this to your list of pretenders to

our favour." "Most assuredly, dear Madam, we have introduced him for the very purpose. Monster, as you call him, he is one of the most harmless and gentle in the world. Aye, and playful in the bargain. Only give heed, we prythee, to the written character (in a domestic situation) of one whom you are pleased to designate a Caliban." "After a time (says his master) he became quite tame and playful, and sometimes amused himself by tossing about a ball of cotton with his horns. He was very fond of sugar moistened, and the juice of raspberries.—There's a pet for you! so delicate in feeding and playful as a fawn;—and now for his name. He is not a fawn exactly; but he is a stag—*Lucanus cervus*—Stag-beetle. We have said not a word as yet about his *horns*; but we have told you of his *jaws*; and though of horns he is not destitute, the enormous toothed appendages to which he owes his name are veritable grinders. To look at, they are, in truth, tremendous weapons; but they are innocent of all save vegetable blood; and used only to wound the tender branches of oak, or birch, or chestnut, for extraction of their circulating fluid. It is possible, indeed, that, with intent most harmless, he might mistake a lady's finger for a silver birch-twigg, or a peeled band of hazel, and sorely pinch it, even to the flowing of the crimson sap: of this, therefore, let his mistresses beware."

Like the majority of his Beetle brethren, *Lucanus cervus* is accustomed to keep within covert during day, and take its flight about the hour of sunset. Its appearance, when on wing, has been likened to that of a flying duck in miniature. The wood of decaying trees is the nursery wherein, as a grub or larva, this insect forester passes the period of its infancy. We have now a Stag-beetle "set up" before us, and we are compelled, as we look upon this insect giant (a dwarf though, in comparison with some of its foreign relatives), to confess that he is a wonderful and admirable creature. So solid—so compact—so perfect—so permanent; he has nothing about him of insect lightness and fragility. Armed, not merely "to the teeth," but to the very eyes, in his encasing panoply of ebon

hue and ebon hardness, even death makes no impression on his outward form; and the ten years' occupant of a collector's cabinet shows as fresh and life-like, in all but motion, as a really living specimen. The same qualities of perfection and permanence belong, more or less, to the whole order Coleoptera, comprising the numerous varieties of the Beetle tribe.

Then (a striking contrast with the above rotundities) there is the pretty and many-coloured tribe of Weevils¹—of form elongate, and further lengthened by a slender beak or rostrum, employed as a spiggot for the tapping of their favourite sappy wine. One of these, now very abundant, especially on the black-thorn, is a little fellow, with a coat of green verditer—sometimes glossed with gold.

We have spoken elsewhere of the most interesting of all objects for which insects can be kept—that of observing their transformations, and the varied processes of their constructive skill—those especially of the Order Lepidoptera, comprising moths and butterflies. If this practice, instead of being nearly confined to professed entomologists, were very generally followed, the country would have fewer idlers, Nature more admirers, and (it could not be otherwise) the God of Nature more praise.

Were we to talk about pet-caterpillars, we might be set down as more monstrously absurd than even in our recommendation of pet-beetles; but, however people may smile at the idea, it is seriously and perfectly true that we have had certain caterpillars long enough in our keeping to have acquired for them a sort of fondness, and to have felt sorry when their change came. Of these some were the beautiful larvæ² of the sphinx or hawk moths, which, with their gaily-coloured and sometimes shagreened skins, mitre-shaped heads, horn-like tails, and sphinx-like attitudes, seem to have so little

¹ Weevil (*Curculio*).

² Larvæ of the Sphingidæ (Hawk moths or sphinxes).

horn-like tails, and sphinx-like attitudes, seem to have so little of the crawling worm about them, that one can hardly help regarding them almost as creatures *sui generis*. Specimens of these may be found, next month, upon the poplar, lime, and privet.

But foremost of our favourites, among their kind, are those wonders of the willow, the gaudy caterpillars of the puss moth,¹ which sitting up so demurely on their boughs look, even more than the sphinxes, like animals which "stand" as well as sit "alone."² After having watched and tended one of these singular creatures from its tiny kittenhood (and then very like a kitten it is) up to the period of its *cat*-erpillar growth, we have really missed it from its 'customed seat—a perch of willow stretched across its box; and whereon, when nearly arrived at its bulky maturity, we have often upheld its painted body, while, with head protruded from its hood-like shoulders, it has set busily to work upon a fresh supply of leafy provender.

Now only let some of those, who laugh at the idea of fondness for a caterpillar, ask themselves if they have never felt fondness for that whereon a caterpillar feeds—for a plant—we mean that peculiar liking, distinct from general, which we are apt to entertain for a favourite plant of our own. To tend on anything day by day—to minister to its benefit—for that thing to depend on us for life—though perfectly unconscious of such dependence—is enough, it can hardly be disputed, to create a feeling which borders on attachment for even an inanimate object. Is it strange, then, that from the like causes the like result should follow with a creature endowed with consciousness, and possessed of senses resembling our own?

We know, indeed, that flowers are (as they should be) universally loved, while insects (the creatures of all others most nearly allied to them) are, as they should not be, almost univer-

¹ *Cerura vinula*.

² See vignette to "A Summer's Day's Dream."

sally disliked. But in proof that the latter prejudice may be overcome—not by argument, nor yet by ridicule—but by the seeing of the eye, we must be allowed to quote our old domestic, in whom it was the growth of seventy years, and deep-rooted in the weedy soil of ignorance. Like all persons of her class, and many of a higher, she held the orders of beetle and caterpillar in especial abhorrence; and when we first began to keep “our hobby” in the house, Martha was almost as highly disconcerted as if we had brought home a new housekeeper.

We value our humble friend a great deal too highly ever to feel quite indifferent about her opinion—far less her feelings—however founded in lack of knowledge or in weakness. We essayed, therefore, quite as much for our sake as for hers, to overcome her prejudice against the insect race, and we have succeeded; but it was by means of going to work very gently with her antipathies.

We fanned them with the wings of butterflies—dazzled them by the lustre of our golden chafers—amused and fairly deceived them by the oddity of our caterpillar “puss.” Having thus cleared a loop-hole for its entrance, we threw in on each of our subjects a ray of light,—by the double evidence of eyes and spectacles, convinced our wondering convert that butterflies are of caterpillars come—that there is no such great difference, after all, betwixt the green chafer, our love among the roses, and the black-beetle—her horror among insects—and even that there are not wanting strong features of family likeness between the sitting “puss” of the willow and the common crawler of the cabbage.

These were steps of progression; and we have now brought her—or, perhaps we should say, more generously, she has brought herself—to look with complacency on our insect menagerie—nay, what is more, has brought her fingers to bring us, and with a smile of triumph, what she (poor soul), in spite of all our schooling, takes for something *new*—albeit,

perhaps, a caterpillar from a cauliflower, or a cockroach from the kitchen. She even looks with a reconciled eye upon our pet stag-beetle.

Apropos of this Goliath of British Coleoptera. Though reputed to live on sap, we have never, during the six weeks of his captivity, seen him extract it from leaf or branch by pressure of his pinching jaws. His preferred and chosen fare is the syrup from sugared bread, and the only leaves he cares for are those of which the surface is bespread with honey dew. He seems, in short, to dispense gladly with all labour incidental by nature to procurement of food, and, provided always that he be defended from the unwelcome intrusion (by a leafy canopy) of daylight, seldom evinces restlessness, not even of an evening,—his time when at liberty for taking wing.

On two occasions only has he shown impatience under confinement, and these have been previous to and during thunderstorms, when atmospheric influence has urged to the most energetic efforts at escape.



“Here’s a pet for you!”



In this vignette are represented a few only of the innumerable insect inhabitants of an Oak. On the leaf at bottom is a group of the black and yellow caterpillars of the Buff-tip Moth (*Pygæa Bucephala*), as they are accustomed to repose in company after or before a change of skin. Over these, a miniature file of the same, newly-hatched, are marching in order over a leaf, from which, as they proceed, they strip the upper surface. Higher, towards the left, is a nest of silk, with indrawn leaves, woven for winter occupancy by the social caterpillars of a Gold-tail Moth (*Porthesia auriflua*). Dependent by a silken line from the branch above, hangs one of the moth caterpillars termed "Loopers" (*Geometridæ*), of which there are two others, one fixed motionless at right angles with a branch, the other walking, or *looping*, on the edge of a leaf. These occupy the right-hand oak; and on the same, attached to branches, are two of the curious structures of the moth caterpillar called the Oak-bark builder (*Pyralis strigulatus*). Several Tent-makers (*Tineidæ*) are traversing the intermediate leaf, and a carnivorous Beetle (*Scarabus clathratus*) is ascending the branches in search of prey.

THE TRIBES OF AN OAK.



WE have ascended to a lofty eminence, whence, as a spectator of London looking from the summit of St. Paul's, we are taking a bird's-eye view over a populous city. In the highways swarm a motley multitude, passing and repassing, some on business, others on pleasure. Some are employed in the erection of solid habitations—others are raising shady tents upon the spots of verdure with which, above all other capitals, this city abounds. Others, again, are weaving for their occupation large silken hammocks, or are rocked within them by the breeze, while they take refreshment or repose. Of these, some are now issuing from their luxurious abodes ; and, as if the footways (although of wood), were too rugged for their tender feet, are laying down silken carpets on the ways they are about to tread. Yonder, on one of the smooth green areas, slowly advances a compact military-looking body, marshalled in files, dressed in uniform, and headed by a leader.

And now what have we here ? A group, as it would seem, of pantomimic players, belonging to some strolling company. Truly, they are clever fellows in the art of posture-making.

Look at one of the performers. He grasps with his feet an upright pole, with which his body, extended horizontally, stiff and motionless, forms a right angle, of which both sides, instead of only one, look as if formed of wood. What prodigious strength of muscle ! He looks like a cataleptic patient under the hands of a mesmeriser. See now one of his companions—head and feet nearly met upon the ground—back raised into an arch or Greek Ω . This strange position would seem but a part of his walking-movement ; for now, stretching

forward, he plants, as it were, with his hands, another step ; then drawing up his rear, brings feet and heel again almost together, and so progresses, looping as he goes, and measuring the ground he treads on. A third of his comrades, dressed in like manner, is sitting idle on a horizontal pole, raised a tremendous height above the ground. But now—powers of earth and air!—he throws himself off his station, and must be dashed to atoms ! Not he ! the rogue ! for there he hangs suspended by a slender rope, mid-air, like “one that gathers samphire.” Will he let himself drop, now, from that still fearful height, or has he yet more length of rope (hid nobody knows where) to let him down easy. By Jove ! neither. He’s climbing up again by the line to which he dangles : and now he’s reached the top—the place from whence he fell. Bravo ! master tumbler ! Bravo ! most excellent posture-masters ! You shall have our interest for a season at Vauxhall !

Contrasted with these, who seem the idlers of the city, we see, here and there, tottering under enormous burthens, and distinguished by their dingy hue, large heads and slender frames, some who appear the most laborious of all the labouring population. Occupying the lowest quarters of the metropolis, and emerging from underground, this class corresponds, apparently, with the subterranean dwellers of London and all great capitals—denizens of cellars and dark kitchens, and drudges of the community.

This, and much more, though nothing perhaps altogether new, is to be seen “under the sun,” in the highways of this extensive city ; and there are also other things (alas ! not new either) going on in the shade and the bye-ways thereof. There murder is boldly stalking, or silyly lurking. The strong are preying on the weak. Members of one society, nay, of one family, are openly attacking or secretly injuring each other ; while greedy parasites are for ever preying on the substance of those by whom they live.

Now, shutting our eyes on the creations of Fancy, let us open them on the realities of Nature.—Where are we?—Our populous city, like Aladdin's palace, has disappeared, and in its stead stands, in solitary grandeur, a stately oak-tree. The oak itself, with certain of its usual occupants, has stood, in fact, for our opening sketch. The objects have been traced precisely as they exist. Let us only fill up their outlines, and give to each a name, and we shall have no picture of fancy, but a faithful representation of dwellings that are raised and of the dwellers which raise them, if not on every oak tree, in every wood of oak.

To begin with the builders, and their solid erections, completed or in progress. Following the course of some branch (or highway) we shall presently perceive them. And here we have one¹—a covered structure of triangular form—its walls composed, apparently, of a sort of tiling, which resembles in colour the bark of the smooth branch whereon it is seated—and there we see another—and another (call them what you will, huts or palaces)—not contiguous, but as regular in plan, aye, and more so, than the houses in our best-built streets. On another diverging branch are several similar erections, in different stages of progression, and employed on each of them we can discern a single artizan, who is preparing the abode for his own solitary occupation. This labourer is a small yellowish white caterpillar, tinged with red, each segment of his body being studded with tufts of red hair. He has fourteen feet, and the upper part of his body is more flat than in the generality of the caterpillar crew. He has also two brown spots behind the head. On commencing operations he measures (using his body as a rule) the place intended for his structure—the basement of which is of a triangular form, with the apex at the lower end. “The bricks or tiles of which the building is composed are small rectangular strap-

¹ Vignette.

shaped pieces of the outer bark, cut out from the immediate vicinity. Upon the two longest sides of the triangular base he proceeds to build uniform walls, also of triangular shape, and both gradually diverging from each other as they increase in height. When finished, the little architect proceeds to draw them together by pulling them with silken cords till they bend and converge and meet. When the two longest sides are thus joined, an opening is still left at the upper and broadest end of the triangle, which being filled up in a similar manner, the building is complete"¹—without, and, when tapestried with silk, is furnished within. This clever bark-builder, for whose operations May is the usual season, is the caterpillar of a moth.²

Next for the tent-makers—those who, not living in the streets, set up their lighter tabernacles on the verdant spots—the green parks of our embowered city; in other words, upon the foliage of the oak. These also are caterpillars, belonging to a family of small moths,³ which employ the leaves of various trees not only for food, but also as material for the construction of most curious and elegant abodes. "These tents⁴ are from a quarter of an inch to an inch in length, and usually about the breadth of an oat-straw. They are of the colour of a withered leaf, being cut out, not from the whole thickness, but artfully separated from the upper layer, as a person might separate one of the leaves of paper from a piece of pasteboard."

Next to these, and much more conspicuous on a survey of our insect city, come the silken hammocks and their luxurious occupants and weavers. These are also caterpillars—those of a moth in some years very common, called the "Brown-Tail."⁵ Instead of, like the "tent-makers," working by themselves,

¹ Insect Architecture, p. 198.

² *Pyralis Strigularis*.—Kirby.

³ *Tineidæ*.

⁴ Vignette.

⁵ Silken Hammock Weavers. Caterpillars of Brown Tail Moth (*Porthesia auriflua*), and of Gold Tail, ditto.

and for their own exclusive accommodation, these are a social race, and labour together at the formation of their nest or hammock,¹ which is composed of greyish silk, and in form irregular, either roundish or angular, according to its situation either in an angle or at the extremity of a branch, the leaves of which are drawn together and included within the walls. The most careless of strollers must often have noticed, towards autumn and through the winter, not only upon oaks, but also upon beech, apple, and pear trees, and very frequently on the rose, large web-like masses of silk, with leaves enclosed, and these are the abodes of which we speak. This common dwelling is partitioned within into chambers for one or for several occupants, which communicate by doorways. When the frosts commence, the silken walls, both outer and inner, are thickened by new layers of tapestry, and thus snugly fortified, their inmates, who are also wrapped in sleep, bid defiance to the autumn gales and cutting blasts of winter. When invited abroad by the genial breath of spring, and the tender leafy provender which spring provides them, the members of this luxurious community begin to make excursions from their protecting tabernacle; and on these occasions the leader of the band always lays down for the succeeding steps of his companions a strip of woven carpet. This silken clue serving as a guide, the caterpillar-ramblers, however far and wide their predatory travels, have no difficulty in returning to their home, to whose shelter they are always driven by heavy rain or scorching sun. Both the hammocks and habits of these social "Brown-Tails" nearly resemble those of the black, scarlet, and white caterpillars of the "Gold-Tails," also common on the oak. It is observed by Réaumur (speaking of these treaders upon silk), "*Nous pavons nos grands chemins; elles tapissent les leurs.*"

Where now is our corps of seeming soldiers?—the body

¹ Vignette.

which we saw progressing in regular "rank and file" across one of the smooth green areas of our city. Most of the social caterpillars, whilst occupying a common abode, are accustomed to move in a certain degree of professional order; but the species more especially celebrated for the soldier-like regularity of their marchings, which are performed in parallel files, from one to six deep, and always headed by a single leader, is the "Oak processionary," a native of France, but not, we believe of England.

The Tumblers and Posture-masters, whom we have described in the exhibition of their wonderful performances in the branching streets of our leaf-embowered city, belong to another and very peculiar tribe of Moth Caterpillars. From their singular mode of progression—wherein they seem, as it were, to *measure* the ground over which they pass—they are called "*Measurers and Geometers*,"—also "*Loopers*," because they accomplish every step by alternately stretching out and *looping* up their bodies in the form of a Greek Ω. They are no less remarkable for the singular positions which their extraordinary muscular power enables them to assume, when quiescent. Attached to a branch by the hinder legs, they will remain, for hours together, stiff and straight, stretched out at an angle from it, or bent into some contorted curve. Of this description are the walking-branch caterpillars, elsewhere noted.¹

After these, some of the most idle of our city's population, we took notice of the most laborious—the occupiers of subterranean dwellings in its lowest quarter. Now, looking round the oak tree for their insect representatives, we presently discern them, in a dingy multitude of laborious ants—bearing their bulky burthens, and issuing from their dark abodes, excavated in the trunk or root. These are Jet Ants, or Emmets—black and shining as well-fed negroes—and without whip, or master,

¹ Vignette.

save their ruling instinct—as laborious as the hardest-driven son of Afric.

Such are a few, and a few only, of the groups in activity, the labours in progress, within and about the oak; but under our figure of a city, we have spoken of various deeds of darkness as being also in constant committal within its precincts. Where, amongst these, do the weak escape the ravages of the strong? and, amongst the tribes of an oak, numerous are the helpless which are for ever falling a prey to the powerful. Carnivorous ground beetles are climbing, by day and night, up the rugged sides of the tree, to devour the helpless caterpillars which abound thereon. Of these destroyers, some are dark and grim of aspect (such as the Devil's Coach-horse),¹ but there are some of them beautiful as ferocious: one—a very demon of destructiveness, with channelled armour, resplendent in green and gold—clad, in the phrase of the poet, even as

“A mailed angel on a battle day.”

But an angel verily of darkness, for ever engaged in attack and slaughter of the defenceless and unarmed.

This brilliant destroyer is the *Calosoma Sycophanta*, a beetle rarely seen in England; but a species smaller and darker, the *Calosoma Inquisitor*—an insect also of no little beauty—is not at all uncommon, during the present month, on the oak and hawthorn.

In no other locality has the extensive tribe of *Parasitic* or *Ichneumon* *Flies* more fertile field for its insidious practices, than amidst the numerous tribes of an oak.

A corpulent caterpillar is stuffing his furred or velvet doublet with the juicy pulp of a young and tender oak-leaf. An *Ichneumon* Fly, poised in air above him, her iridescent

¹ Rove Beetle (*Staphylinus*).

wings and black-shining body glittering in the sun, is fearfully vibrating her tail-like piercer, with intent to plunge it into the fleshy back of her well-fed victim. She stoops—her weapon enters—is withdrawn—and leaves behind it, in the wound, a germ of nascent torture a thousand times more dreadful than a drop of deadly poison—a tiny egg deposited within the warm orifice pierced for its reception. In a few hours this egg becomes a gnawing worm, which thrives and fattens on the vital juices, leaving carefully untouched the vital organs of the hapless gormandiser, thus compelled to foster it. Its growth completed, the parasitic grub emerges, and then, in completion of its murderous part, spins a silken thread, with which it proceeds to bind the nearly exhausted body of its supporter to the surface of the oak-leaf. Thus manacled, the shrunken remnant of the once plump-crawler exists yet a few miserable days, while the young *Ichneumon*, having enclosed itself within a shroud of silk, undergoes its transformations, and finally emerges into perfect life, a sparkling fly, like its parent, close beside the then dead body of the creature by which it had been nourished to maturity.

In the above general picture of an oak tree city, and its occupants, we have taken the license of the dramatist and painter to group together several insect personages, which are not likely to be seen assembled under the sun of a single summer's day, though all are almost certain to be found in the course of a summer—excepting the social *Hammock Weavers*, who only occupy their abodes from autumn to spring.

A single oak-bough will often present to our view an universe of insect worlds in the numerous galls on leaf, stem, and catkin, differing in size and form, but all produced (as we have seen already) by the puncture of a little fly.

Even the acorn has its peculiar and appropriate insect; each lichen, moss, and fungus—oak derived—swarms with its insect denizens; while the oak-supported ivy is the grand resort,

especially in autumn, of innumerable flies and bees, which, when scarcely another flower is remaining, find food in its honied blossoms and shelter under its glazed foliage.

In our most imperfect review of the insect tribes, which depend for their all of life and enjoyment on the oak, one can hardly help being reminded of other orders of being more or less indebted to the same vegetable benefactor—even from man, who building house and ship with oaken timber, is assisted to perpetuate his thoughts by *oaken* and *insect* galls—to the bird who, building his eyrie on oaken branches, derives a part of her support from oak-residing insects, and, by dropping the acorns, helps, in return, to extend the race of her protecting and supporting tree.



"Even the Acorn has its appropriator."



This vignette comprises four Butterflies not figured in the Frontispiece to our First Volume. That on the Thistle to the right is the Clouded Yellow (*Colias edusa*). That on the left with folded wings, the Painted Lady (*Cynthia Cardui*). The Purple Emperor (*Apatura Iris*), lessened by distance, soars above, and flitting below is the Small Skipper (*Pamphila linea*).

A FEW FRIENDS OF OUR SUMMER GLADNESS



ET us fill up our slight sketch of "Butterflies in general" by a few outlines of the chief among their tribes, which are native to our island.

In our winter's pursuit of "Life in Death," we have adverted already to the hardy few (survivors of the fugacious many), which are accustomed to resort in autumn to some snug recess, fold their wings, wrap round them their cloaks of torpor, and thus, "taking no note of time,"

to await the spring, unless allured by the wintry sunshine to pay us a few unseasonable, but ever welcome, visits. Among these, the "little Tortoise-shell," and the beautiful "Peacock," of whom more by-and-bye, are the intrepid pair which most often gladden and surprise us in the time of yellow aconites and Christmas roses; but after these, we may be on the watch, towards the end of February, or on the first gentle mornings of early March, for a flutterer more welcome still, as the herald of a real and no fictitious spring. This is the "Brimstone Butterfly,"¹ which, gaily painted,

" Soon
Explores awhile the tepid noon,
And fondly trusts its tender dyes
To fickle suns and flattering skies."

It has been supposed by some that this early visitant (also a late one) is, like the above, a winter survivor; but from the trim of his yellow robes, usually so fresh and glossy, it would seem more likely that, instead of being laid up—not "in lavender," but, perhaps in ivy—they are of the newest spring fashion. Be this as it may, he is the very pink, or, as he has been more properly considered, the very primrose of Papillons, sometimes to be seen, like a living shadow of the primrose's self, fluttering beside it in the sunny hedgerow or the sheltered copse. We may know him by the cut of his bright sulphur-coloured pinions—each, instead of being rounded, ending in a smooth tail-like angle.²

Of all the wings of all the Butterflies, these bear, perhaps, the closest similitude to floral productions, and on each, as if to perfect the resemblance of their delicate flower-like colouring, is a reddish spot, an exact copy of that often produced by decay or accident, on the surface of a yellow petal. In the beautiful raised veining of their reverse, the pinions of the "Brimstone"

¹ *Gonopteryx Rhamni*.

² For figures of nearly all the Butterflies here mentioned, see Vignette.

are no less correspondent with the same; but those of the female, which, instead of yellow, are of a greenish white, resemble, perhaps yet more nearly, the leaf of a poplar on its under side. The dye of the antennæ—that purplish pink, so frequent upon tender leaf and flower stems,—also the clothing of the body,—a soft, satiny down, like that by which stalks and seed-pods are so often invested, are all alike accordant with the floral character of this most elegant flutterer of the spring. This pretty butterfly comes of a pretty caterpillar, with a smooth green coat, dotted or shagreened with black, and marked by a whitish line along the back and sides. It is said to feed usually on the leaves of buckthorn and alder.

The term *Papilio*, which was used by Linnæus to designate all diurnal or day-flying *Lepidopteræ*, has now become much restricted, including, amongst a company of brilliant foreigners, only one or two native species.

Of the latter is the “Swallow Tail,”¹ a beautiful insect, approaching more nearly to some of the tropic butterflies, both in form and colouring, than any others which our island produces. Perhaps, in favour of its richer painting, we ought to have given it the precedence usually assigned it over our favourite Brimstone, with all its simple elegance; but besides being of later, it is also of more rare appearance, and we have a preference always for bespeaking attention to the beautiful things that are most common, rather than to those which cross our path less often. If, however, that path should lead us through the counties of Hampshire, Middlesex, Cambridge, or Norfolk, we are not unlikely, from May to August, to meet the Swallow Tail; and he is a *Papilio*, we can tell you, much too distinguished to pass by unrecognized, if we can possibly prevent his cutting, at once, the air and our acquaintance.

Compared with the Brimstone he is truly a magnificent

¹ *Papilio Machaon*.

bashaw; but then, in the place of *four*, he can only boast himself of a *pair* of tails, of a peculiar fashion, appended to his hinder wings, which are scalloped, and adorned each with a red, eye-like spot, their prevailing colours being, like the anterior ones, black and yellow—a fitting case for the enfold-ing, while latent, of so much beauty. The caterpillar of the Swallow Tail Butterfly is one of the handsomest of its race. It has a smooth skin, beautifully variegated with black and green, and carries, at the back of its head, a badge of distinction, not however, always visible, in the shape of a flexible horn, forked like the letter Y, which, contrary to the usage of the snail, it is said to put forth on occasions of alarm. It is a feeder on um-belliferous plants, chiefly the carrot, wild and cultivated, from whence it has acquired, in France, the name of “Le grand Carottier.” Of another genus, with hinder wings, rounded instead of angular, or tailed, is the pretty butterfly known as the “Clouded Yellow.”¹ In England, however, it is known but partially, appearing only in certain seasons, and then chiefly on the coasts of Kent, Sussex, and Suffolk. As its name imports, the prevailing hue of its wings is yellow, clouded towards their outer edge with black. The caterpillar, green with white lines, is said to feed upon leguminous plants, though the perfect insect delights chiefly in the flowers of the thistle.

Coming out with the flowers of May, and almost as abundant, are the pale-winged Butterflies, which, like bebies of white-robed damsels, usher in the summer. From whence have they issued forth? 'Tis almost a pity that, as insect genealogists, we must trace their origin, and confess the most of them to have been

“Born in a ‘cabbage,’ in a ‘cabbage’ bred”—

and that they have come, therefore, from purlieus—the walls—most likely of the kitchen garden. But what matters it whence

¹ *Colias edusa*.

they sprang, or whence they came, since they have left behind them, buried in the hearts of kale, or transferred therewith to cabbage-feeders of another sort, the vulgar tastes which belonged to their caterpillar birth? The fragrant meadow, the sunny hedgerow, the gay parterre, now constitute their range,—their meat is honey, washed down by pearly dew-drops. These are the Butterflies of the genus *Pontia*, known universally as the common white—so universally, that description is hardly needed for their general recognition, though requisite enough for distinction of their several (as many as about seven) species. At the head of them is placed, usually, the large “Cabbage White”¹ of the garden, with yellowish mealy wings, the foremost nearly triangular, the hindermost rounded, and as if sprinkled with grey towards the body. The anterior pair, both of male and female, are tipped with black, but those of the latter are marked with two black spots, wanting in the pinions of the former. The caterpillar of this primary *Pontia* is that devouring familiar of the potager, to which gardeners, sparrows, and Ichneumon flies require not a word of introduction; but on account of others, who, for the sake of the butterfly, may desire to make its acquaintance, we may just notice that its general hue is bluish-grey, spotted with black, besprinkled with short hairs, and marked by a yellow line along the back with one on either side.

Also of the *Pontia* genus there are the “Little Whites”²—come of little green caterpillars (the French *Vers du Cœur*), feeders on cabbage-hearts—the “Green-veined Whites”—so called from the nervures of their wings being marked on the underside with dusky green—and the large “Hawthorn Butterfly,” or “Black-veined White.”³ The latter is a handsome insect, with semi-transparent cream-white wings, strongly veined with black.

The pretty “Orange-Tip,” or Lady of the Woods,”⁴ is

¹ *Pontia Brassica*.

² *Pontia Brassica*.

³ *Pontia*, or *Pieris Cratægi*.

⁴ *Pontia Cardaminis*.

likewise of the cabbage family. In its *green* youth it is a feeder also upon rape, cabbage, and other cruciform plants; but this, while a *cater-pillar*, is no *pillager* of *cates* of culture, preferring the vegetable in its wilder growth—a taste more accordant, certainly, with the habits of its maturity and the favourite spots—such as open glades, and lawns, and woodlands, whither it delights to fly, a-Maying. Though we are accustomed to designate this darling of the summer as the “Orange-Tip” and “The Lady of the Woods,” these epithets, applied in conjunction, or indifferently, are not by any means of correct application, seeing that with these butterflies it is the *lord* only of the *lady*, whose white pinions, besides bearing a black crescent, are adorned by the patch of deep orange, which makes the title of “Orange-Tip” befitting to him alone—in both himself and partner the wings on their reverse are beautifully variegated in white and green.

We come now to the fan-winged genus *Vanessa*, comprising some of our commonest, but also most beautiful and richly-coloured, Butterflies—all, like the last, with the fore-legs imperfect. Among these is the little “Tortoise-shell,”¹ noticed already as a survivor of, and occasional visitor in, winter.

The caterpillars are greenish black, with yellow stripes, and spiny, like the nettle on which they feed; while young, in large societies, which afterwards disperse. The “Great Tortoise-shell,” or “Elm Butterfly,” is much larger, and less common than the above.

A glorious insect of the same tribe is the *Vanessa Io*, or “Peacock’s Eye.” Its prevailing hue is a rich brown red, inclining to purple, each wing being adorned by a large eye or ocellus, with a dark pupil, margined by a crescent or semi-circle of blue and yellow.

The caterpillar, which is shining black, studded with white

¹ *Vanessa Urticæ*.

points, is, like the last, a feeder on the nettle, and is found, commonly in July, throughout the south of England. An old naturalist styles this Io-Butterfly, the *Omnium Regina*, and she well deserves the title. The above is an autumn Butterfly, and so also is the *Vanessa Atalanta*, known, likewise, as the "Alderman," the "Admiral," and the "Admirable;"¹ and admirable truly are the "colours" displayed by this "Admiral of the Red," as he proudly unfurls them in the August or September sun, and challenges the autumn flowers to eclipse his glory. Nor is there one among them—neither velvet dahlia, nor golden mary-flower, nor many-coloured-aster, which can boast of hues at once so rich and varied. The deep black of his upper wings is enlivened by a broad cross band of brilliant scarlet, white spots, and a scalloped edging of the same; while on the secondary pinions the scarlet, which instead of a bar forms a border, is enriched by a line of black spots, a black and white scalloped edging, and a small blue crescent at the inner extremity of both wings. Their under surface, if less rich, is even more varied in colour, and more finely pencilled than the upper.

The caterpillar of this beautiful insect, which is greenish black and spiny, is a solitary feeder on the nettle, found not uncommonly in July and August. By means of a silken thread he draws together, edge to edge, a single leaf, out of which he thus forms himself a temporary tent or case, with openings at either end which go on widening before the jaws of its occupants. When he has thus fairly "eaten himself out of house and home," he betakes himself to another leafy abode of similar construction. This "Alderman" caterpillar is found sometimes feasting on the seeds of the nettle; but still under cover of the upper leaves.

Closely allied to this beautiful genus, *Vanessa*, though belonging to that of *Cynthia*, is the "Painted Lady,"² or

¹ Vignette to Butterflies in General.

² *Cynthia Cardui*.

"Belle Dame," a butterfly, as its name imports, of exceeding elegance. Its upper wings, brown towards the base, and redder towards the middle, are variegated and tipped with black, and marked at the apex with a spot of white.

In some seasons our "Painted Ladies" are abundant, in others scarce; but of all the *Lepidoptera*, these are considered to have the widest geographical range, having been seen in America, Africa, and Asia, also frequently out at sea. Their caterpillars are feeders chiefly on the great spear-thistle, whose unmanageable leaves they yet continue not only to eat but also to roll, as well as those of the nettle and other spiny vegetables.

In the genus known to naturalists as that of *Hipparchia*, we have another of the butterfly tribes, more distinguished for sombre than for lively colouring. Their caterpillars, usually green with forked tails, assimilate with the various grasses on which they feed; and even when arrayed in winged attire, their prevailing shades of brown and orange bear still a degree of correspondence with the hues of the ripened and sunburnt clothing of their favourite localities, the meadow and the heath.

Amongst other species, not rare, the most common of this brown brotherhood, perhaps, of all the race of butterflies, excepting the Cabbage Whites, is the "Meadow Brown."¹ The wings of the male are of a uniform blackish brown, enlivened by a small black eye with a white pupil. Beneath this ocellus there is in those of the female a large irregular patch of orange buff, and all her pinions are more prettily, and somewhat more gaily, painted on their under than their upper sides; the foremost with dark orange, the hindmost with shades of light brown.

According to their usual arrangement, we come now to that assemblage of pretty little butterflies, of the genus *Thecla*, known to collectors as the "Hair-Streaks."² They are so called from the fine hair-like lines streaking the under side of their

¹ *Hipparchia Janira*.

² *G. Thecla*.

wings, of which the hindmost pair are further distinguished by one or two tail-like appendages. The caterpillars of these little butterflies which feed on trees and shrubs—never on herbaceous plants—might hardly be taken, save by the entomologists, for caterpillars at all, being of an oval depressed shape, resembling very nearly that of wood-lice, and are hence called onisciform.

In the genus *Lycæna*, we have, fresh from the mint of nature, that bright coinage of meadow butterflies, yclept the “Coppers.”¹ One of these, the most common, also the smallest, is a splendid little flutterer,² with the primary wings of red metallic lustre, spotted and bordered with deep black; the secondary, brown and black, margined by a coppery band—encountered not unfrequently, early in the summer, also in August. This is the little Copper Captain, the fiery Mars of his radiant tribe, so renowned for making war upon his own kindred, and even daring to engage with antagonists of twice his bulk, but without his mettle. The caterpillar of this most common of the Coppers is greenish yellow, onisciform, and, like the majority of those belonging to its tribe, it is a feeder upon sorrel and other herbs of the field.

Contrasted with the Metallic Coppers, and often seen side by side, are the “Aerial Blues.”³ These are the little blue butterflies, which, loving to disport over the thymy down, the grassy glade, and flowering meadow, do literally “paint them with their own delight.” Now, arising in sportive pairs or trios, they enliven the fragrant air. Now, basking on the yellow buttercups, or chalk-sprung flowers of their own colour, they reflect, in the hues of their expanded wings, every tint of the summer sky, from deep, deep blue to lightest azure, or the glowing lilac, which precedes the sun-set red; while ever and anon, closing their pinions, and opening thereby the *many eyes* which bestud their under surface, they seem to look

¹ *G. Lycæna*. ² Vignette to Butterflies in General. ³ *G. Polyommatus*.

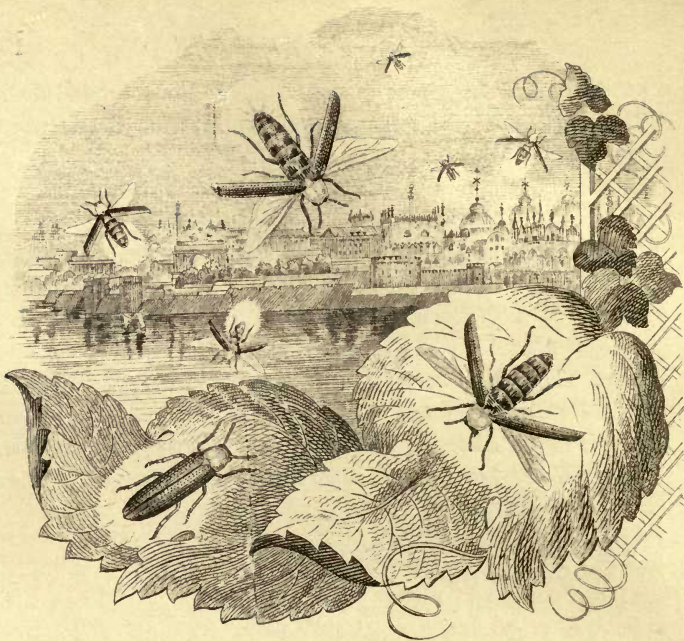
out in smiling happiness at the beautiful things around them. These belong to the genus *Polyommatus*, from Greek words expressive of the many eyes, or eye-like spots which adorn, as just noticed, the reverse side of their blue or brown wings.

The "Grizzled Skipper,"¹ also a common species in woods and pastures, has upper wings of dark brown, enlivened by squarish spots of cream or straw colour: the hinder pair prettily variegated, and all edged by a fringe of alternate black and white. The caterpillar of this, as well as of some other species, is a leaf-roller, the teasle being the apparently uninviting plant which, nevertheless, affords him board and lodging. Others of the *Hesperidæ* feed, in their caterpillar infancy, on other low plants and grasses.

¹ *Pyrgus Malva*.



"Sipping their cups of dew."



The Flying Glow-worms of Southern Europe (*Lampyris Italica*), known in Italy as "Le Lucciole," are the insects here represented.

LE LUCCIOLE.

A MIDSUMMER TALE.



N Midsummer Eve, or the Eve of St. John (1679), the palaces and hovels of *Genoa la Superba* were illuminated in honour of the Baptist by an artificial blaze, contrasted with which the lamps of nature looked cold and dim. Yet nowhere are summer evenings more brilliantly lit up than on the shores which bound the Gulf of Genoa; for, besides the "rulers of the night," robed in the clearest of nocturnal blue, and shining forth in regal splendour, there are stars of the

earth—radiant galaxies of Italian fire-flies, which, rising from the low underwood, or falling from the lofty trees, shoot through the air in scintillating streams of living light.

Away from the glare of the city, and from its noisy revelry which rose at intervals, on their unheeding ears, a youth and maiden were wandering in the garden of one of those villa palaces then numerous on the outskirts of Genoa. They were, of course, lovers; for none others, so near their scene, would have been absent from that evening's festivities. The figure of the young man was commanding, and correspondent with his dress, which bespoke him to be of noble rank. His features also were of uncommon beauty; but an eye, well versed in the lines of character, might have detected about them a certain expression of weakness—a wandering of the eye, and an effeminate softness of the mouth, which gave suspicion of the like defects of disposition; and one, certainly, who should have so read his countenance would not have very greatly wronged the character of young Marco, only son to the Marchese Bassano, owner of the stately villa, in the grounds of which he and his companion wandered. The latter was a fair girl—a fair Italian—with eyes deeply blue, like her native skies, and rich brown hair which seemed to have stolen of its golden gleams. She was this, and more; but she was not, like her lover, of patrician birth, and her lowly rank was indicated both by her peasant's dress and the air of simplicity; yet, withal, of gentle grace, with which she wore it. The converse of Marco and his sweet Bianca was so low as to be nearly overpowered even by the gentle murmur of the sea, as it broke upon the adjacent shore, and the slight stirring of the surrounding foliage; while, at intervals, their voices were wholly drowned by the shouts of revelry which rose from the illumined city.

Heard clearly above the mingled sounds rising from the city, the clock of the Annunciata struck nine. It was a signal for the pair to separate—Marco to join a party of gay com-

panions at the festival—Bianca to return to the abode of her father, an old vine-dresser, who had lived from his youth upwards on the estate and in the service of the Marchese Bassano. His cottage was in the midst of an olive grove, which adjoined the garden of the villa, and communicated with it by a gate opening on a terrace walk which overlooked the sea and town. It was here the lovers had been walking; and Marco, having accompanied his innamorata through a portion of the olive grove, they were repeating for the last (perhaps the twentieth) time, their reluctant "*Buona notte*," when Bianca started—"Heard you not," said she, "a rustling amongst those trees?"

"Not I, sweet one," returned Marco;—but as he spoke he plunged into the plantation in the direction towards which she pointed, and shook the boughs as if to detect the presence of a suspected lurker. None appeared; but from the shaken branches arose a swarm of fire-flies which, checked in their upward flight by the thick foliage above them, kept wheeling in radiant streams and circles near the disturbers of their rest. "There, silly one! now art thou satisfied?" cried the young man, returning to the pathway. "The *Lucciole* have displayed their lamps on purpose to show thee the emptiness of thy fears; and see! in honour of St. John have we not here a brave illumination?—a show of fire-works shaming the brightest that are let off yonder? Aye, and my loved one, thou shalt not want for diamonds in thy hair—gems which the proudest of yon city dames display not one to equal."

Marco, as he spoke, opened and closed his hand upon several of the fire-flies which were flitting around him, and sportively placed them in the coloured net-work which confined the maiden's luxuriant tresses. Bianca shrunk—almost shrieked—as she tried to arrest the playful action of her noble lover. "Marco! for the love of heaven, do not so! Those *Lucciole*—if you knew how I dread them!"

"Dread them?"

"Yes; bright as they look, they come from the dark graves; and with us, in our family, they have always been omens — warnings of death and dolor. Before my poor mother died"——

"Nay, nay," cried Marco; "now thou art more silly than I deemed thee."

Yet he strove, at the same time, to remove the glittering causes of alarm. When with some trouble he had disengaged them from the net-work, one yet clung to his hand, and, on shaking it off into the air, the insect, as if proud of the place it had lately occupied, instead of joining its companions, flew back, and settled on Bianca's head. Not a word, this time, escaped her lips; but she turned pale and trembled. Her lover again gently chid her—again displaced the Lucciola, and threw it far into the underwood. Then, supporting the steps of the frightened girl, accompanied her to within a few paces of her father's cottage, once more whispered his tender "*Buona notte*," and departed to join in the revels of the night—prolonged far into the morning.

* * * * *

Twelve months had brought round another Eve of St. John, and brought with it, and on just such a summer night, the like festivities—the like illuminations.

Had the year been productive of as little change to our high-born youth and low-born maiden? To Bianca, the proud noble, who should have been as nothing, was, in womanly devotion, still *everything*. Yet had he become an everything which she was now required, and, in womanly disinterestedness, was ready to resign.

And Marco? Why, he still loved the peasant girl, as well, perhaps, as ever—as well as a young patrician (though sprung of merchant princes) might. His heart, such as it was, was still Bianca's; but his hand, in accordance with the desire and policy of his father, had been for many months pledged, and

in a few days was to be given, to the beautiful and haughty Beatrice, a daughter of no meaner house than that of Doria. With this purposed alliance, long known to all Genoa, Bianca was of course acquainted. It was a finale to her misplaced affection only such as might always, sooner or later, have been looked for, and neither resentment nor jealousy embittered the dispensation under which she meekly bowed, as the just and inevitable penalty of her having dared to love before she knew the meaning of either love or rank. But here was the misery, if nothing worse, to live, as heretofore, within the very shadow of the house, which was to be the future residence of Marco and his bride, who were to abide at the Palazzo of the former's father. How often had Bianca wished that she could flee to some distant land, where, as she fondly but deceptively believed, that if she could never quite forget him, she might sometimes think of him without offence.

Before the arrival of the present Midsummer, this, her desire, seemed likely of fulfilment. Whether the old Marquis had suspected something of the attachment, commenced almost in childhood, between his son and Bianca, and thought that the latter would now, therefore, be better at a distance, or, whether it were mere accident that favoured her wish; but so it was, that the Marquis having recently (as was a common custom with the Genoese nobility) purchased an estate in the more fruitful territory of Naples, proposed to the old vine-dresser that he should take the office of its superintendency. The faithful servant, who would not for promotion have left his "own people," but to whom his master's will was law, urged moreover by his daughter, agreed to the proposal, and they were to sail together for their new southern home in a galley now at anchor in the bay.

Old Jacopo was sad, as the remembrances, both pleasant and painful, of sixty years, all passed under that humble roof, came back, like a mingled company of departed spirits, and seemed to take possession of every corner—every bit of furniture in

the cottage,—all, with itself, to be left behind. He almost felt as if he were about to part with everything he loved—even his darling child—though she was to be the companion of his exile. Not only was he sad, but also weary with preparations for departure; and that he might be all the fresher for the morrow, Bianca persuaded him (after one last look from between the olive trees at the illuminated city, and after they had offered up together their evening orisons) to repair early to his bed. With one hand clasped in his, she sat beside him, till he fell into a quiet sleep; then kneeling by the bedside implored the Divine blessing on their morrow's voyage, and the change it was to bring them; and she prayed, also, that no guilty repinings—no vain regrets—connected with one left behind, should ever disincline her to the cheerful performance of her duties, those especially she owed to him, her kind old father. On rising, she gently kissed his forehead, and treading lightly, left the chamber, meaning presently to seek her own.

Ah, Bianca! which of the sweetest enticements of that Midsummer night could break thy purpose, and lure thee to go forth? Was it the evening breeze whispering among the trees close by, or the distant murmur of the placid sea? Was it the breath of the evening-scented flowers, or the shouts of revelry rising from the illumined city? It was none of these; but it was an impulse, sudden, irresistible, which urged her to take one last, one little look at that dear garden, where she had been used to play, and not alone always, in her childhood. From the garden three minutes would take her through the olive grove, and give her a parting glimpse—just only one—of the terrace walk beyond,—that walk connected with remembrances more recent and more dear than all. But one thought made her hesitate,—might she not meet him? Oh no. There was that night, at the Palazzo of the Marchese, a grand masked ball in honour of the evening's festival, and also of the approaching bridal. The ducal family of Doria was to be

among the guests. Beatrice—in all the blaze of jewels, rank, and beauty—queen of the night,—Marco, her devoted subject, in a day or two to be her lord.

“Oh no,” thought Bianca, as she hastened through the grove; “there’s no fear that I shall meet with *him*.”

She found the gate open which led from the olive plantation into the Palazzo garden, and had only to step at once upon the terrace walk, which lay in the bright moonlight, clear and unoccupied.

“Bianca—my Bianca!” whispered a well-known voice, and Marco, wearing a Spanish dress and masked, but to her in no disguise, stood beside her. What could he, the young patrician, the affianced, well nigh the wedded husband of a fitting bride, have now to say to her, the foolish maiden of low degree, who had too long listened to his beguiling tales? Why, even at this eleventh hour, he had yet another for her ear—a tale of love and seeming madness. He had stolen away, he said, from yonder brilliant company,—from Beatrice, the brightest of them all, to seek his Bianca, as he had purposed, at her home. *They*, she and her old father, should still sail on the morrow, at early dawn; but *he* would be the companion of their voyage. The captain of the galley should be bribed to convey them not to the Neapolitan estate but a port of France, and there, without a thought of rank, of home, or even of honour forfeited, he would make her his lawful bride.

The maiden heard only to reject the dazzling, dangerous proffer; but Marco still urged; when distant voices were heard shouting out his name, and turning towards the villa they saw several persons issuing from under the piazza, and advancing towards them. “Go, go, Marco! May blessings ever attend thee!” and Bianca, as she spoke, burst from her lover’s detaining grasp, and retreated from the terrace, behind the screen of a tall adjacent shrub. The young man followed for a pace or two, then stopped and hesitated. He distinguished, amongst the approaching voices, that of Pietro Doria, Beatrice’s

brother. Do what he might it was as well to save appearances; so with another look towards the spot where Bianca stood concealed, and with inward maledictions on the noisy group which was drawing near, he turned to meet it. Some of the party had caught a momentary glimpse of a retreating female figure; but the Lady Beatrice, as well as her betrothed, having been missed from the ball-room, it was only supposed that the lovers had stolen from the festive scene for half an hour's converse beneath the gentle moon. Maidenly bashfulness might explain the lady's flight, and her preference for returning to the palazzo alone rather than accompanied by the merry maskers.

Having seen them all re-enter the building, Bianca issued from her covert. As she left the moon-lit terrace, and regained the olive grove, a thrill of terror, sudden as the transition from light to darkness, shot through her frame; her limbs trembled, and she was glad to seek the support of an aged olive, the trunk of which, partially decayed, showed white in the surrounding gloom. Not once that night had she thought of the dreadful *Lucciole*—not one had flitted across her path; but at the moment she touched the olive tree, they fell around her from amongst its foliage in a shower of living sparks.

Well now might the maiden tremble; well might the drops of terror mingle with the night-dews on her marble brow; not for the harmless glitter of the *Lucciole*, but for a glimpse of gleaming, and no fancied horrors, which their light revealed. She saw (for an instant) the sparkling of diamonds amidst raven tresses—the flashing of dark eyes distended with vindictive fury—the glittering of jewels on a white uplifted arm—the gleaming of cold blue steel directed to her heart. In a brief agony of fear she clung to the olive's trunk; in an agony, as brief, of supplication, she raised her mild blue eyes imploring mercy: but mercy there was none in those dark orbs of vengeance which returned their glance. The bright stiletto did not miss its aim, and, clear in the encircling radiance of the

Lucciole, a crimson stain on the bleached trunk of the olive, showed, even in that place of shade and hour of darkness, that a deed of murder had been done.

Poor Bianca ! Then did thy simple superstition seem to have met with terrible fulfilment. The *Lucciole* had come to thee indeed as messengers of death ; but in their radiant guise they were the more fitting representatives of ministers of mercy, sent, perhaps, in good time, to rescue thee from danger and from sin.

* * * * *

Early next morning the old vine-dresser was up, and dressed, ready for departure. He wondered why Bianca was not stirring too ; “ but, poor thing ! ” thought he, “ she shall rest as long as may be.”

Jacopo, while this was passing through his mind, busied himself in a few remaining preparations—even got ready their simple breakfast,—ever and anon, in the midst of his occupation, going to listen at his daughter’s chamber door. “ How soundly she is sleeping,” whispered he ; “ but hark ! there’s the Annunciata striking six ; we’re to be on board by seven ; so wake her I must.”

He tapped gently—louder—more loudly. “ Bianca ! Bianca !—wilt thou never awake ? ”

A death-like silence ensued, and something of chilling augury smote upon the old man’s heart, even before he opened the door, and saw that the room was tenantless—the bed unruffled.

Then he ran wildly forth—calling as wildly on his child. The early chirp of the birds in the garden and the olive grove was his sole response.

But he soon found her, and he (poor miserable old man !) was soon found with her, sitting under the half-dead olive tree ; her head supported on his knees, and he smiling in childish vacuity, as he tried to disengage her luxuriant hair from the clots of blood which confined it.

The father and his child were thus discovered by two mariners, sent by the master of the galley to summon his expected passengers, and assist in taking on board their luggage.

Whilst one of the seamen remained with old Jacopo, who would neither move from the body of his daughter, nor allow it to be touched, the other hastened to the palazzo, with tidings of the tragic event which had occurred. His tale of horror was related first to the domestics; but he must see, he said, the Marchese or his son. The former, he was told by the servants, could not be disturbed so early; but their young master, the Count Marco, had been up, they added, by times,—if, indeed, he had gone to bed at all on the conclusion, at no very early hour of the morning, of the last night's entertainment. One of the servants was about to apprise him of the mariner's business, when Marco himself appeared.

The terror-stricken faces of the seaman's late auditors prepared him for some correspondent recital; but not for the trembling, agonizing surmises which followed on the man's brief relation; and when, in a private interview, particulars were detailed which left no doubts, as far at least as concerned the person of the victim, it is difficult to say how the young noble was able (if he did so) to disguise the fearful intensity of his individual interest in that which had befallen.

It is more material to our narrative to notice that the seaman's chief motive for desiring to speak with the masters of the palazzo was to put into their hands a splendid jewel—a bracelet—which he had picked up, he said, lying close beside the murdered maiden. None of hers (he suspected) could be an ornament so unsuited to her rank and her attire, and it might point to the hand by which she had fallen.

Marco, forcing himself to say something in praise of the mariner's honesty and sagacity, put a gold piece into his hand, as he received into his own the glittering bauble, on which hung, perhaps, its owner's life; and who that owner was

Marco knew well at a single glance. The bracelet was a gift of his own to Beatrice, and hers, beyond a doubt, was the hand which, instigated by jealousy and wounded pride, had plunged the murderous steel into the heart of her humble rival.

In an hour after the mariner had left his father's villa, Marco was closeted at the Palazzo Doria with the Duke. Their interview was long; but to the curious eave's-dropper quiet as the grave.

Marco never returned to Genoa, and fell in battle a few years after, having taken service in the army of the French, at that time allies and almost masters of the once proud Republic. And the miserable Beatrice!—what became of her? Never did detected culprit, condemned by man's erring judgment to give up life for life, suffer a penalty so dread as hers. The rank and power which had served to shield her from public condemnation did not stifle private suspicion: and though to breathe a name like hers in conjunction with a deed of murder was more, perhaps, than any inhabitant of Genoa, noble or plebeian, would have dared to do, yet on the city walls, which the Italians, with reference to such a use, have termed proverbially "*Fools' Paper*," some daring hand had ventured, in ambiguous but intelligible terms, to write up her accusation.

But what was this to the "hand writing on the wall," which above every festive board, on the frescoes of every sparkling saloon, on the tapestry of her own chamber, presented itself in characters of blood before the eye of Beatrice. For a season, and with a view by braving to disarm suspicion, did the wretched lady compel herself, or was compelled, perhaps, by her noble family, to face the world; but the colour had fled her cheek; her dark eye grew hollow, and at last she veiled them from public notice in a convent of Benedictine Nuns.

There, none were more exemplary in their vigils, their penances, their prayers, than sister Agatha, the name by which the once proud Beatrice Doria was known amongst the nuns.

Never to one of them (whatever she might have done in the confessional) did she open the dark secret of her soul; but those of the sisterhood, who occupied adjoining dormitories, told fearful tales of the sounds of agony—groans from the depths of overwhelming dread which, at times, were heard to issue from her cell. Other of her habits caused remark. Seldom in broad day-light, never of an evening when the nuns were assembled in the convent garden, was she of their number; but always after sunset did she keep the window of her cell close shut, however sultry might be the weather. Could Beatrice have feared the gentle breezes of a summer's eve? Them she loved not; but far more had learned to hold in terror and aversion the fire-flies, the *Lucciole* which came forth when they arose.



Then shalt not want for diamonds.



The winged insect in the centre of the vignette is the common Sewer-Fly (*Eristalis tenax*); beneath, on the bank, are three pupæ of the same, remarkable for their rat-like tails; three others are shown at a distance within the hollow of a decayed willow. Three of the grubs, or larvæ, also rat-tailed, and notable for their tough skins and consequent tenacity of life, appear in the water to the left, but drains and sewers are more properly their habitat.

LEASES OF LIFE.



HE Demon of Frost set out, one dark November morning, to do the bidding of the grim monarch Death. He passed over a forest, and the last leaves of autumn fell in countless thousands at his touch. He passed over a desolate moor, and meeting a benighted traveller, he heaped his snow bed, piped his shrill lullaby, and whistled at knowing it

was the wanderer's last. He entered a garden, and the surviving dahlias shrank in their velvet mantles, and died at the bidding of his icy breath. Then he laid one of his freezing fingers on a little caterpillar, and the ramping worm grew stiff as iron, and chinked like a stone, as it fell upon the ice-bound earth.

The Demon of Frost went home, well pleased with his work, and after many another walk, upon the like death-doing errands, traversed once more, towards the end of February, the very path he had followed in dark November. Then he saw in the forest but a few remains, half rotted, of his victim leaves. On the desolate moor he passed over the whitening bones of his victim man. In the flower garden not a vestige was visible of his victim dahlias. But where was his supposed victim caterpillar? Amidst the crystal gems of his own scattering, as they melted in the smiles of his arch enemy the sun, sat a saucy butterfly, and the Demon of Frost shook his hoary locks, and gnashed his icy teeth; for he knew that the tiny spark of life which animated that winged creature was the very same which must have laughed at his power in the frost-stiffened caterpillar.

But what has the Demon of Frost, or frozen caterpillars, to do with this melting season? We will endeavour to explain their unapparent relationship, or tell at least how they have been brought to our own minds, as connected with the present time of year.

Every particular season tells a particular tale or tales of some prevailing and appropriate burthen. This, the season of Midsummer, tells especially of *life*,—life in its maximum, like the sun at its highest,—life on the earth,—life in the waters,—life in the air, busy and joyous; and for every single tale of life told by other things, a million are being repeated in the world of insects.

This is also a season of *leases*, just expired, or just renewed. Some, a week ago, were leaving willingly, some reluctantly, their old abodes, while others (contumacious tenants) are still

holding fast upon their roof-trees, laughing at notice, landlord, writ, and bailiff. Now of insects in general, save the bee and the silk-worm, it may certainly be said, according to our motto, that

“He’s his own landlord,—his own tenant:—stay
Long as he will he dreads no quarter day.”

This, as respects his local habitation; but if we consider the principle of *life* as the *tenant*—the outward form the *residence* held at will of the indulgent landlord—the Great Creator of us all,—then the tiniest of midges holds, as the greatest of men, a given lease. Regarded thus, the vital spark, or tenant, whose assigned abode is an insect tabernacle, is oftentimes a most difficult spark to *put out*,—a leaseholder as troublesome to eject (we mean, of course, at the bidding of *subordinate* agents) as the most determined house-clinger that ever baffled bailiff ingenuity.

It is a fact, proved by observation and experiment, that caterpillars will retain their vitality, and pass through their usual changes, after the congealment of their juices by intense cold. Those of the magpie-moth, exposed all through the winter on a leafless currant bush, will sometimes become stiff as the twigs they occupy, and those of the cabbage butterfly subjected to a frost which turned them into lumps of ice,¹ arrived, nevertheless, at their perfect state.

Other insects would seem to be endowed with the same power of resisting cold. Amongst these are gnats and mosquitos, which, as attested by recent travellers, have risen, an active swarm, from dissolved masses of ice, wherein they have lain imbedded as thick as plums in a Christmas pudding.

Nor is it only against the “Demon Frost” that these determined insect occupiers are accustomed to bar the doors

¹ By Réaumur.

of their Lilliputian tenements, a variety of them having been found to show equal contempt of flood, fire, famine, and steel, those other bailiffs employed as often, in executions, by the universal tyrant.

To exemplify, next, the resistance of insect vitality against the power of *water*. There is a certain beetle called the *Printer*,¹ because, while feeding as a grub upon the under bark of trees, it cuts out therein a variety of tracks resembling letters; and to such an extent was this species of type engraving once carried on, that a million and a half of pines are said to have been sacrificed in the Hartz Forest² to supply material for the work. It became, of course, desirable to knock up a business carried on at such serious public cost; but though these devils of printers were battered, together with their type, within their books of bark—though the trees of their habitation were laid upon ice, and finally plunged in water, they remained alive and unhurt.

A somewhat similar but yet more wonderful instance of obstinate vitality has worthily obtained a place amongst the “*Miracula Insectorum*” of Linnæus. This is afforded by certain tough-coated grubs,³ with rat-like tails, which are common inhabitants of drains and stagnant waters. These, often becoming part and parcel of the turbid pulp used in paper making, exposed afterwards to the action of wooden mallets, and finally squeezed in strongest presses, are declared frequently to have survived uninjured these annihilating operations.

In July or August these miraculous little animals assume the chrysalis or pupa, still retaining their rattish tails, and, early in September, cleave the air as black and yellow flies, bearing some resemblance to drone bees.⁴ We found last summer, laid up in the decayed wood of an old willow, a large

¹ *Bostrichus typographicus*.

² In 1783, Kirby and Spence.

³ Rat-tailed larvæ (*Eristalis tenax*) Sewer Fly.

⁴ Vignetto.

assemblage of these rat-tailed pupæ, which had probably, while yet grubs, deserted, for the hollow of the tree, some stagnant and very uninviting pools adjacent.

But what is the tinge of the marvellous, investing the above relations, compared with the red-hot hue of wonder which colours the following almost incredible, yet (as it would seem) not ill attested anecdote? The summoners here were the united powers of fire and water—the sturdy spirits of bees the little contumacious tenants which refused to dislodge for all their combined authority.

Mr. Beddome, a respectable chemist of Tooley Street, London, in a letter to the editor of the *Times*, which was copied in the *Times Telescope* for 1822, thus writes: “I bought twenty large hives, and a hogshead of Dutch honey in the native state, not separated from the wax, which had been in the warehouse above a year; and, after emptying the hives as well as I could, I boiled them for a considerable time in water, to obtain honey from between the interstices. A considerable number of bees, mixed with honey, floated on the surface of the water. These I skimmed off, and placed on flag-stones outside my laboratory, which was at the top of the house, exposed to a July meridian sun. You may imagine my astonishment, when in half an hour I saw scores of these bees, that had been for months in a state of suffocation, and then well boiled, gradually come to life and fly away. There were so many of them that I closed the door, fearing that they might be disposed to return, and punish me for the barbarous usage they had received at my hands.”

The above we must confess to be a marvel of marvels; but there is something scarcely less wonderful in the stubbornness with which the vital sparks of many insects have been known to hold out within the tiny citadels of their bodies when called on to surrender, not by flood or fire but by famine. We read of a chameleon fly subsisting nine months upon air,—of a church-yard beetle living without food for

three years,—of sheep-lice existing twelve months in a shorn fleece; while the grub of an aphid-eating fly,¹ left under a glass, was found alive three months afterwards, the thread of its existence having been actually eight times doubled by the very circumstance seeming most adapted to cut it short.

Lastly, it is not always that cutting steel, or festering brass, are effectual in the severing of that slender thread on which, nevertheless, the life of an insect hangs so strongly suspended.

We are told of beetles found living weeks after impalement on a transfixing pin. We daily see crane-flies (more commonly known as father-longlegs) footing it featly over the grass, or “upstairs and downstairs,” with one or more of its half-dozen shanks deficient, and flying merrily, with scarce even a leg left to walk on.

Indeed the famous fable of Agrippa would by no means apply to many of the insect race; for with them, certainly, there does not seem to exist the same degree of mutual dependency observable in other animals between the body and the members. The severed head of a wasp will bite while its severed leg clutches a morsel of sugar, as if they were saying to the detached stomach, “We have no need of a digester;” and the dismembered body, in return, will sting furiously, as if to reply, “And I have no need of a directing head or assisting limbs.”

The same is exemplified in the instance of a dragon-fly, which, deprived of its long abdomen, was seen² to devour two small flies. Connected with this obstinate vitality of insects comes naturally the question of their sensitivity, which, from this very vitality, we may certainly infer to be less acute than with other animals. Happily for them, and certainly much to our own comfort, when we think upon the subject, we have far more reason to doubt than to believe the oft-repeated dictum, that

¹ By Kirby.

² By Mr. Haworth.

"The poor beetle, which we tread upon,
In corporal sufferance feels as great a pang
As when a giant dies."

The existence of any insect brain has been denied by Linæus and subsequent naturalists; but Cuvier and Lamarck so denominate the upper knot of the nervous chord, because distinguished by the sending forth of nerves to the principal organs of the senses. The multiplied and detached centres of sensation, thus furnished by the knots or ganglions, sufficiently account for life and motion in the divided portions of insect frames; also for their seeming to feel comparatively little general pain from the loss of limbs, or even head.

Last, not least, there is another reason, built on the moral attributes of the Great Creator, for believing that the insect frame is one of extreme insensibility to outward injury. Can we imagine that He whose "mercy is over all his works," would do other than protect by a shield of comparative obtuseness that innumerable multitude of living things, which, from their numbers and minuteness, often also in the seeming end of their creation (that of affording food for others), are exposed to continual mutilation, as well as violent destruction. Were it otherwise, independently of what they would endure from other agencies, of what an infinity of insect sufferings should *we* daily, hourly, minutely, be the involuntary cause!

Children are almost always disposed to the commission of acts of cruelty; but only in most cases from ignorance or want of thought: for there is, we believe, in every unperverted mind a natural repugnance to the taking of the life we cannot give. Long ago we attempted to make something of an entomologic collection—were eager enough in pursuit—too rude, doubtless, in triumphant capture; but when it came to the cold-blooded business of impalement, the pin fell from our grasp, and the prisoners regained their liberty. We were then too happy in the bright buoyancy of our own spring-time to bear to deprive one of them of an existence so much like our

own. Having grown what some would call more callous, others, less squeamish, we have, since, been the voluntary agents of insect extinction, though only when absolutely essential to the purposes of our pursuit. We have elsewhere offered, as we hope, an ample defence for "our hobby" on this its seemingly objectionable side; but that defence was addressed to the reason rather than the feelings, consequently not to the *very young*. We would not even *desire* that the *very young* should be permitted to begin the study of insects by their collection; but it is different as life advances: for ourselves, at least, we can affirm safely that, though we do occasionally add a beetle or a butterfly to our collection, the acquisition is always made at the cost of a degree of not diminished pain, and we were never so careful, as now, to avoid aught that may uselessly injure or torment one of the insect crew.



"Then get me at defiance!"



The three larger insects in the foreground are females of the Brown Ant (*Formica brunnea*), called sometimes Ant-flies. Two of them are actively employed in pulling off their own wings, the third having already divested herself of these appendages. The smaller Ants upon the ground are workers of the same species: those in flight a male and female.

A SYLVAN MORALITY; OR, A WORD TO WIVES.



WE have a young relative, about whom we are going to relate a little anecdote connected with insect history, which requires, however, a few prefatory words.

At the age of 17, Emily S— “came out,” gilt and lettered, from the Minerva Press of a fashionable boarding-school, and was, two years afterwards, bound (in white satin) as a bride. In the short period intervening be-

tween these two important epochs she had had a prodigious run of admiration.

When Emily married, and for a few months previous, it was of course to be presumed that she *had* found something better than the world whereon to fix the affection of her warm young heart. At all events, she had found a somebody to love *her*, and one who was worthy to be loved in return.

Soon after their marriage the happy pair set out for Paris. F—, though his means were slender and tastes retired, made every effort (as far as bridegroom could so feel it) to gratify his lively young wife by a stay at the capital of pleasure. After a subsequent excursion, they returned within a year to England, and settled at a pretty cottage in Berkshire, to which we speedily received a cordial invitation. It was no less readily accepted; for we were anxious to behold the “rural felicity,” of which we little doubted that our friends were in full possession.

The result, however, of a week’s sojourn at their quiet abode was the reluctant opinion that, somehow or another, the marriage garments of the young couple did not sit quite easy; though to point out the defect in their make, or to discover where they girted, were matters on which it required more time to form a decided judgment. One thing, however, was pretty obvious. With her matronly title, Emily had not assumed an atom of that seriousness—not sad, but sober—which became her new estate; nor did she, as we shrewdly suspected, pay quite as much attention to the cares of her little *ménage* as was rendered incumbent by the limited amount of her husband’s income. She seemed, in short, the same thoughtless, pleasure-loving, pleasure-seeking girl as ever; now that she was captured, the same volatile butterfly as when surrounded and chased by butterflies like herself.

Poor Emily! her love of gaiety had now, it is true, but little scope for its display; but it was still strongly apparent, in the rapturous regret with which she referred to pleasures past, and

the rapturous delight with which she greeted certain occasional breaks in the monotony of a country life. An approaching dinner-party would raise her tide of spirits, and a distant ball or archery-meeting make them swell into a flood. On one or two of such occasions we fancied that F—, though never stern, looked grave—grave enough to have been set down as an unreasonable fellow; if not by every one, at least by that complex “everybody,” who declared that his wife was “one of the prettiest and sweetest little women in the world,” and, as everybody must be right, so of course it was.

We had passed some weeks at our entertainer’s cottage, when rumours got afloat, such as had not disturbed, for many a year, the standing and sometimes stagnant pool of Goslington society. The son of Lord W— was about to come of age, and the event was to be celebrated by grand doings; a varied string of entertainments, to be wound up, so it was whispered, by a great parti-coloured or fancy-ball. Rumours were soon silenced by certainty, and our friends were amongst those who received an invitation to meet all the world of Goslington and a fragment of the world of London, about to be brought into strange conjunction at W— castle.

Nothing was said then upon the subject; but we saw the next morning something very like coolness on the part of F— towards his wife, which was returned on hers by something very like petulance. Ah! thought we, it all comes of this unlucky fancy ball! We had often heard it declared by our friend that he hated every species of masquerade, and would never allow (though this was certainly before his marriage) either sister, wife, or daughter of his to attend one.

The slight estrangement spoken of did not wholly pass away, though so trifling were its tokens, that no eye less interested than our own might have noticed their existence. Indeed neither of the parties seemed really angry with the other, appearing rather to think it incumbent on them to keep up a certain show of coolness; but whenever the sunny smile of

Emily broke even partially through the half transparent cloud, it dissolved in an instant the half-formed ice of her husband's manner. By mutual consent the subject of the fancy ball seemed left in abeyance, and while in every circle, for miles round, it formed the central topic, in ours it was the theme forbid. Thence we tried to infer that it was a matter abandoned, and that Emily's better judgment, if not her good feeling, had determined her to give up her own liking, on this the very first occasion on which, we believe, her husband has ever thwarted it.

Well—whether, as with us, awaited in silence, or, as with the many, harbingered by the music of many voices—the grand event marched on; and a day was only wanted of its expected arrival, when business called F— to London, from whence he was not to return till late at night. Soon after his departure, which followed an early breakfast, we left Emily, as we supposed, to the business of her little household, and repaired, as was our wont, to the library,—a small apartment which our friend F— had made the very bijou of his pretty cottage. Having taken down a choice copy of the *Faery Queen*, we committed our person to an ebony arm-chair, and our spirit to the magic guidance of our author's fancy. Obedient to its leading, we were careering somewhere betwixt earth and heaven, when a slight noise brought us down for a moment to our proper sphere; yet hardly,—for on looking up we beheld, standing in the wake of a coloured sunbeam, from which, on wings of gossamer, she seemed to have just descended, an unexpected apparition of surpassing grace and beauty. Titania's self, just stepped upon the moonlit earth, could scarcely have stood poised on an unbroken flower-stalk, in form more airy, in attitude more graceful, with countenance more radiant than those of Emily F—, as, arrayed in likeness of the *Faery Queen*, she thus burst upon our view, and with an air half archly playful, half proudly triumphant, enjoyed our bewildered surprise, and received the involuntary homage of our admiration.

We saw in a moment how the matter stood ; Emily was really going to the fancy ball ; and this, of the Queen of Fays, was the fantastic and too bewitching costume she had chosen to assume. Knowing her kind heart, and having believed that its best affections had been gained by her estimable husband, we were vexed and disappointed in our young relation, and felt it only right to give, if we could, a check to her buoyant vanity, by letting her feel the weight of our disapproval, shown, if not expressed. "So I see, Emily," said I, in the coldest tone ; "I see, after all, that you are going to this foolish ball."

The beaming countenance of the beautiful sylph darkened in a moment, like a cosmoramic landscape. "And why not ?" returned she pettishly : "I suppose then you don't approve."

"*My* approbation can be of very little import, if you possess that of your own heart, and that of your husband. Under what character, pray, does he attend you ? I suppose he plays Oberon to your Titania ?"

Emily's face reddened. Some strong emotion heaved her bosom, and I saw that pride alone kept the starting tears from overflowing. "Charles," said she, with an attempt at assumed indifference, "will not be there at all ; I am to go with Lady Forrester."

We felt more vexed than ever, and wished to say something which might yet hinder the young wife's intention ; but while considering what that something should be, or whether, indeed, our age and slight relationship gave a sufficient right to say anything, we looked down for a moment on our still open book. Of that moment Emily availed herself to effect an escape, and on raising our eyes we only caught a glimpse of her glittering wings as she glided through the door-way. Our first impulse was to recall her ; our next thought, to leave her to herself. If her better nature still struggled, remonstrance of ours, we considered, might only serve to set wounded pride against it ; and wounded passions, like wounded braves, fight most desperately. We saw no more of our young hostess till the hour

of dinner, to which we sat down *tête-à-tête*. Emily's sweet face had regained all its usual expression of good humour, and by almost an excess of attention, and an effort at more than ordinary liveliness, she strove to make amends for the slight ebullition of temper stirred up by the morning's incident; but her sociability seemed forced, and we felt that our own was much of the same description.

Our after-dinner sitting was soon ended for an evening stroll. It had been a sultry day towards the end of August; the lazy zephyrs had been all asleep since noontide; so, with a view to meet the first of them which should happen to be stirring, we directed our steps towards a high open heath or common. Its summit was crowned by a magnificent beech, towards which we slowly ascended, under a shower of darts levelled by the declining sun; and, on arriving at the tree, were right glad to seat ourselves on the circular bench which surrounded its smooth and bulky bole.

Here, in addition to the welcome boons of rest and shade, we were presented gratis with the exhibition of a finer panorama than the Messrs. Barker ever yet produced.

What a scene of tranquil splendour lay before us; one of those glowing pictures of the declining day and declining year, whereon, like a pair of dying painters, they seem to have combined their utmost skill and richest colours in order to exceed, in a last effort, all the productions of their meridian prime.

After a few moments of silent admiration, we were on the point of exclaiming to our young companion, "Oh! who could prefer the most brilliant ball-room to a scene like this?" but we checked the impulse; for perhaps, thought we, the "still small voice," which speaks from all around us, is even now whispering to her heart. But never, we believe, was adder more deaf to the accents of the "charmer," than was Emily at that moment to those of Nature. Her mind, we are pretty sure, was still running, and all the faster as she ap-

proached it, on that fancy ball. Perhaps she suspected that ours was following the same turn, and knowing of old our habit of making observations upon insects, she, by a little womanly artifice, availed herself of it to divert their course. Pointing with her parasol to a long procession of brown ants, which were crossing the foot-worn area beneath the tree,—“Look,” said she, “I suppose they are going home to bed.”

“Or perhaps to a ball,” rejoined we, quite unable to resist the pleasure of taking our fair cousin in her own *ruse*; “but let us follow them, and see.”

Emily was delighted at having, as she thought, so ingeniously set us on our hobby, and attended us to the spot whither we had traced the little labourers. Their populous settlement bore no appearance of evening repose. Other trains were approaching in various directions, to meet that which we had followed, and a multitude was covering the conical surface of the ant-hill, as if taking a farewell bask in the glowing sunset. Amidst the congregated many, and distinguished from the common herd by very superior bulk and four resplendent wings, were several individual ants, which Emily (as well she might) mistook for flies, and inquired accordingly what could be their business in such incongruous society. “They are no flies,” said we, “but ants themselves—female ants,—though with somewhat of the air, certainly, of being in *masquerade* or *fancy costume*. But say what we will of their attire, we must needs confess that they are in their proper places; for they are the *matrons* of the community, and, as we see, they are *at home*.”

Our young companion made no reply; but stooping down, seemed wholly engrossed by examination of the ant-hill. “Look,” exclaimed she, presently; “there is one of these portly dames without any wings at all. I suppose some of her neighbours have taken up a spite against her, and combined to strip her of her glittering appendages.”

“By no means,” we answered, “*she has laid them aside*

by her own voluntary act. Only see, my dear Emily, here is one of her sisters even now employed in the business of disrobing."

We both stooped, and watched narrowly the curious operation to which we had directed our young friend's attention. One of the larger insects in question was actively employed in agitating her wings, bringing them before her head, crossing them in every direction, throwing them from side to side, and producing so many singular contortions as to cause them all four to fall off at the same moment, leaving her reduced to the same condition as her wingless sister. Fatigued, apparently, by her late efforts, she reposed awhile, after the accomplishment of her purpose, brushed her denuded corslet with her feet, and then proceeding to burrow in the soft earth of the hillock, was speedily lost to our observation. "How very odd!" said Emily; "what can possibly be the meaning of such a strange, unnatural proceeding?"

"I will tell you," replied we, "that which has been thought fully to explain its intention. This insect female, in common with her sisters, has hitherto been privileged to lead a life of entire indolence and pleasure. A few days since, having risen from her lowly birth-place on those discarded pinions, we might have seen her disporting in the air with some gay and gallant companions, of inferior size, but winged like herself. But now her career of pleasure, though not of happiness, being at an end, her life of usefulness is about to begin, and, in character of a matron, she is called to the performance of such domestic duties as will henceforth confine her to the precincts of her home.

"Of what use now, therefore, are the glittering wings which adorned and became her in her earlier youth? Their possession might only, perchance, have tempted her to desert the post which Nature, under Divine guidance, has instructed her to fill. Obedient to its teaching, she has thus despoiled herself of the showy pinions which (essential to her enjoy-

ment in the fields of air) would only have encumbered her in the narrower but more important sphere of home."

Emily listened in silence to our lecture on Entomology, which must have been delivered, we suppose, with peculiar clearness, as she did not, according to her usual custom, follow it up by any further inquiry or comment. We soon afterwards bid adieu to the insect community, and wended our way homewards.

F— returned from London the same evening; but, availing ourselves of an old friend's freedom, we had retired to bed before his arrival.

Next morning ushered in the day, "the great, the important day," of the fancy-ball—neither "heavily" nor "in clouds;" yet greatly did we fear that the pleasant sunshine which greeted our opening eyes would be met with no answering beams at the breakfast-table of our friends.

How agreeably, therefore, were we surprised, when, on entering the parlour, we at once perceived an expression of more perfect serenity, on the countenances both of F— and his pretty wife, than had been worn by either since the day of that confounded invitation.

"Ah!" thought we, "it's pretty plain how the matter is ended; that wicked little fairy has wrought her charms for something—has carried her point—and will carry HIM, her willing captive, to the ball. What poor weak fools fond husbands are! Thank heaven that — Well! perhaps better so than worse."

Breakfast proceeded; chat in plenty; but not a syllable about the fancy ball; till, bursting to know how the case, so long pending, had really ended, we ventured on a pumping query—"At what hour, Emily," said we, "does Lady Forrester come to take you to the ball?"

"I have written to prevent her calling!"

"O, then you are going under other escort?" and we looked slyly at F—.

"I am not going at all," said Emily.

Here she put in ours her little white hand, and looked up archly in our face,—"*I am not going, for I have laid aside my wings!*"

"My good fellow!" said F—, as he took our other hand; "you deserve to be made President of the Entomological Society."

NOTE.

That remarkable procedure of the matron ant, whereon the preceding narrative is founded, is a well authenticated fact. The circumstances attending it were partially noted by Gould, the historian of English ants, Linnæus, and De Geer; and observed and related with greater accuracy by Huber.



"Trapped in likeness of the *Queen*."



Bees in their transformations, or the two preparatory stages of grub or larva, nymph or pupa, the latter nearest to the centre of the board. To the right is a piece of honeycomb, with cells of the common form, with a royal or Queen's chamber attached, as most usually, to its outer edge. The two bees on the wing are workers.

BUSINESS AND PLEASURE.



N our sketch of bees as "a body politic," we have seen how ill befitting is their waxen imagery to serve as a model for human imitation—how frail to falling dynasties the support of waxen pillars; but there yet remains in the economy of the hive (especially as exhibited in bee labour) enough in plenty for counsel, for reproof, for pattern, for reflection, for admiration—all resolving themselves into adoration of Him to whom adoration alone is due.

We are lingering still on the threshold of the hive; and here there meets us a venerable shade who must detain us yet a little longer. How can we enter the bee-hive without a tribute of admiration and respect to him who for us and for thousands had laid the secrets of the bee-hive open—without a word as well as thought of Francis Huber, the bees' best biographer?—the great, the good, the gifted, yet bereft—the clear-sighted, yet the sightless Huber. At this season, nearly a century ago, did he first open on the summer sunshine those admiring and inquiring eyes, which for only a brief portion of a long life were permitted either to behold the glories of day, or to look into the minuter wonders of the animate creation. Yet most marvelously and kindly in his case, as in many others of similar privation, was that privation balanced. Through the eyes of others, aided by his own mental vision of surpassing clearness, he was enabled to keep watch on the works and ways of the little people of the hive, to throw a blaze of light on their heretofore obscure history, and to become, for the wise recreation of future generations, as well as for the amusement of his own otherwise dark hours, their most interesting and circumstantial chronicler.

But besides being happy in his own energetic mind, Huber was also happy in the providential blessing and possession of friends—friends who, in the grand pursuit of his darkened but not gloomy life, were without a metaphor “eyes to the blind”—the blind object of their affectionate regard and admiration. These were, in the first instance, Francis Burnens, an uneducated peasant, yet his faithful friend and constant and efficient assistant; next, his wife; and last, not least, his son, P. Huber, afterwards celebrated for his own researches into the history of ants.

In the circumstances attendant on Huber's marriage we meet with one of those pleasant romances of reality which occasionally vary the monotony of every-day life. At an early age, the sight of our persevering naturalist fell a sacrifice to

minute and intense observation exercised in his darling study. As with our prince of poets, "a drop serene"¹ had "quenched" his "orbs" of vision; nor would he for their recovery undergo the usual operation. Previous to this affliction he had formed an attachment to Mademoiselle Aimée Pullein, daughter of a Swiss magistrate, who opposed the marriage of the lovers on the ground of the young man's blindness. No sooner, however, did the lady arrive at an age which gave her (at least in her own opinion) a right of judging for herself, than (after refusing offers of greater promise) she united her lot with that of the blind yet loving Huber, with whom forty years of subsequent happiness, wherein she was his secretary, his observer, and the sharer, not only of his researches, but of the enthusiasm with which he followed them, gave her no cause to repent her choice. Even when deprived by death of his affectionate helpmate, the blind and then aged Huber was not left destitute of woman's supporting tenderness, which, in the person of a married daughter, Madame Molin, waited on him to the hour of his death, in the year 1831, at the age of eighty-one.²

From the bees' historian come we at last to bees themselves. Close at hand, from a border of mignonette, we hear the voice of the "Oriental Deburah," humming cheerfully of pleasure mingled with labour. And who in this busy little creature can doubt their union, as we see her rolling amidst her golden riches, adroitly brushing the precious dust from off her antlers into the curious panniers with which her thighs are furnished to receive it?

Now, her baskets are full laden, heaped with orange pollen high above their brims; but an elastic fringe of hairs by which these are surrounded hinders their contents from being overturned. Our collector's task is completed for the morning,

¹ *Gutta serena.*

² Huber died at Lausanne.

and thus laden without, and doubtless lined within, by a full measure of the nectared juices, "sucked from buds and bells," she takes wing, and makes so light of all her lading, that straight as an arrow from a bow (and eke as swiftly) she cuts the air, even in the wind's eye, in the exact direction of her straw-built home.

Our bee, as before noticed, was the bearer of a double load—pollen or dust of anthers in her thigh baskets,—nectar in her internal honey-bag; but neither of these floral treasures have been collected for herself.

Fulfilling, in the first place, her duty of loyalty, she offers, as a tribute to her queen, a portion of her honey, pure as at the moment of swallowing,—an operation merely of transfer from the nectary of the flowers to her own honey-bag, or first stomach.

The remainder, all at least except that trifling portion required for her own support, she then deposits within one of the store cells of which the contents are appropriated to the supply of the community; or instead of this, on finding a group of labourers employed in building, to some of them she kindly gives a draught of sweet refreshment.

Her honey thus disposed of—what does she do with her pollen, the golden lading of her triangular thigh baskets? This pollen or farina of flowers—after undergoing a certain process, of which swallowing forms a part—becomes what is called bee-bread, and constitutes, as such, one of the strongest supports of bee existence, especially before arrived at maturity. After being swallowed, it may perhaps be imparted at once to some of the infant occupants of the nursery cells; or, if more is collected than immediate need requires, this, as well as honey, is laid up in store, being diluted and packed for future use.

We have seen how our busy gatherer has brought home her quota of pollen or bee-bread, and honey or bee-wine; but has she contributed to the general magazine her share of wax,—

that material so indispensable to form the "casks," or caskets wherein both these treasures are preserved? She has done her part (doubt it not!) in augmentation of this useful commodity; but on the present occasion she can furnish no wax, because she has given away all her honey.

Why a bee could not contribute wax because possessed of no honey is a question, certainly, which people who know little about bees would naturally ask now; and the same query might have been put less than a hundred years ago even by those best acquainted with their habits.

That Humble-bees, and *all* bees, were in the habit either of collecting wax ready made from flowers, or of manufacturing it from this flowery pollen (the lading of their thigh baskets) was the generally received opinion; and even those close observers, Réaumur and Bonnet, seem to have thought much the same; whereas it is now well ascertained that honey, not pollen, is the original material of wax, which indeed no bee can make without it.

That the primary foundation of wax is not pollen was first concluded by the celebrated John Hunter, on account of its varied colour; whereas that of wax is uniform; and moreover pollen continues to be collected by the workers of those hives wherein the comb is already complete. Huber and others further found, on experiment, that bees fed entirely upon honey and sugar, and deprived, at the same time, of all opportunities of gathering pollen, were able without it to construct combs, though utterly at a loss to feed their brood for lack of the bee-bread derived from farina of flowers. From these and other observations, it was proved, beyond doubt, that honey or sugar, not pollen, is essential to the formation of wax,—a secretion which, exuding from the rings of the bee's stomach, is sometimes visible in the form of scales.

In addition to pollen and honey, with wax hence derived, bees are accustomed to levy, from the vegetable world, another contribution employed in their works of architecture. This

substance, as being chiefly applied outwardly and to the out-works of their waxen structures, is called *Propolis*, from Greek words signifying "before the city." It consists of a brown resin, which was supposed long ago to be the collection of bees from trees producing gums of the same description,—a conjecture since confirmed,—Huber having seen them strip the resin from off buds of the wild poplar and branches placed in their way; while Kirby observed them busy, for a like purpose, on the balsamic buds of the Tacamahaca.

In collection of *propolis*, as in that of pollen, the bee's thigh panners are in high requisition; but, to avoid their being begummed, as well as beladen with this sticky resin, our little gatherer has to knead and render it less adhesive, before she transfers it from her fore feet to the convenient *corbeilles* appended to her hinder limbs.

With this vegetable gum the honey-combs, heretofore pure white, are varnished, and their edges strengthened and secured. It is with *propolis* also that all accidental holes and interstices are filled up.

Subsequent on the brief mention, as above, of the materials employed by bee architects, should follow, properly, a description of the way in which they are accustomed to work them up. We have never, ourselves, had an opportunity of following any of their wondrous operations as carried on within the hive, which, by the way, would seem by no means an easy matter, even when that hive is made of glass. We might easily, however, copy, in an abbreviated form, some at least of the relations given of their proceedings by Réaumur, the indefatigable Huber, and other bee historians; but these, shorn of their detail, would proportionately lose in interest.

Since, therefore, our account of bee workmanship cannot (consistently with our limits) be long enough to entertain, we shall make it so very short, as at all events not to weary. We would wish it, on the contrary, to stimulate, to serve just as an incitement to the abundant but not cloying sweets of Huber's

delightful pages. There will be found in detail, ample and accurate,—*how* that, as a first preparatory step towards the construction of a comb, the bees (called Wax-workers) suspend themselves, from the empty interior of the hive, in necklace-like festoons, and thus remain motionless for hours together, apparently to rest, but in reality to secrete the wax which becomes visible on the rings of their bodies;—*how* that, in step the second, the Bee foundress leaves the group, clears herself a space, goes to work alone (hundreds of spectators watching her proceedings), gathers from off her body, kneads with her mouth, then deposits the first portion of wax, in other words lays the foundation of the waxen city;—*how* this conspicuous individual, then retiring, leaves a second bee to imitate her example; then, in succession, a third and fourth, and so on, till a block or wall of wax is formed at top of the domed hive;—*how*, subsequently, the shapeless mass thus accumulated is excavated and moulded into honey-comb cells,—those admirable solutions of that difficult geometric problem which requires “A quantity of wax being given to form thereof similar and equal cells of a determinate capacity, but of the largest size in proportion to the quantity of matter employed, and disposed in such a manner as to occupy the least possible space.” These conditions are exactly fulfilled in the six-sided cell of a bee, which is of a shape also the best adapted to its body.

Plenty of the worldly wise are disposed, doubtless, to look upon the study of bees, or of any such small people, as altogether foolishness.

Some there are (though not we hope amongst our readers) with whom the tastes and pursuits of the wise and good weigh as nothing, and with whom the intrinsic interest attached to natural objects (could they even be forced to their study) would go for nothing too. These have no minds for the common wonderful—no hearts for the natural poetic, with both of which the works and ways of bees, and of insects in general, are fully fraught.

They would not care a rush (how should they?) for the information of an American poet—the nature-painting Bryan—when he tells us how that

“The bee, a more adventurous colonist than man,
With whom he came across the eastern deep,”

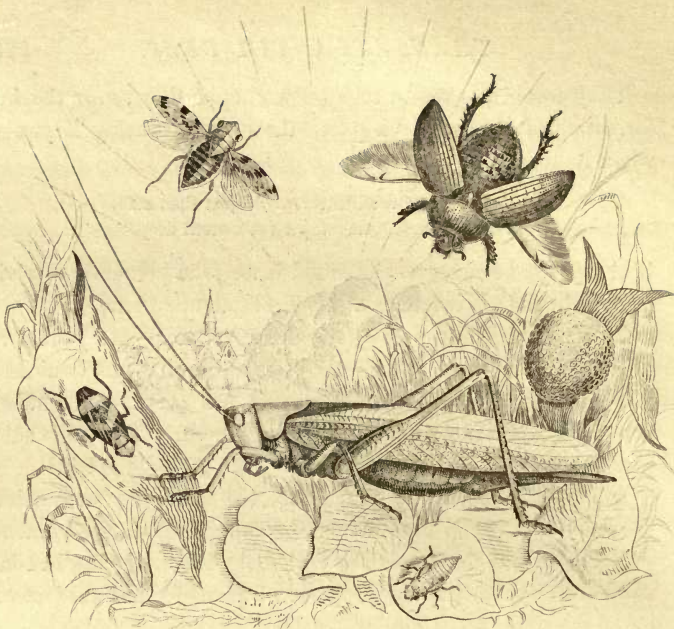
is always (as becomes a wild-wood insect) the precursor of civilization in the giant forests of his Transatlantic clime.

To the strains of the poet (sing he never so sweetly) the ears of the mammon worshipper—the mere utilitarian—are doubtless deaf enough; but the American poet has (or had) a quaker countryman, named (we think) John Schall, who, on the subject of bees, is much more likely to move a sordid spirit.

This gentleman, in the year 1845, was exhibiting in London his American barrel hives of wood, constructed on the humane principle of non-destruction to their busy inmates; and in connection therewith was the proposer of plans for bee cultivation on an extensive and profitable scale.



“Needles of Business and of Pleasure”



The central and largest insect in this summer's evening group is the great Green Grasshopper (*Gryllus viridissimus*). Above it, in descending flight, is the common Dor or Clock Beetle (*Geotrupes stercorarius*). Towards the left, rising on the wing, is a Cuckoo-spit Frog hopper (*Cicada spumaria*), of which another is traversing the leaf of sorrel-dock below. A larva of the same insect occupies a leaf of clover in the foreground, and on the sorrel behind the Grasshopper appears a globular patch of the frothy secretion (popularly Cuckoo-spit), wherein the larva of this Frog hopper is usually concealed. The *Cicada spumaria* is not a sound-emitting insect, but is here figured, as resembling in form, and being allied in family with the foreign *Cicada*, or Tree-hopper, of musical celebrity.

INSECT MINSTRELSY.



F measured by their influence on the mind, those simple notes of harmony or discord, produced by many of the insect race, are of no mean importance in the scale of sounds. Their power must certainly, however, be attributed rather to associate ideas than to any intrinsic excellence

in the sounds themselves, which, by means of such borrowed attributes, have often indeed acquired a character and exercised an influence directly opposite to their own inherent qualities. It accords not with our plan to say much of insect foreigners, whether musical or mute ; but we may cite, as the earliest and one of the most striking examples of what we mean, the song of the classic Cicada or Tettix—the *Tree-hopper* ; by a misnomer—the *Grasshopper* of the ancients. This was the Insect Minstrel to whom the Locrians erected a statue ; some say for very love and honour of its harmony ; others, as a grateful record of a certain victory obtained in a musical contest, solely by its aid. The story goes, that on one of these occasions two harp-strings of the Locrian candidate being snapt asunder in the ardour of competition, a Cicada, lighting at the moment on the injured instrument, more than atoned for its deficiencies, and achieved, by its well-timed assistance, the triumph of the player.

Thus highly was this insect's song accounted of, even at a period when "music, heavenly maid," could scarcely be considered "young ;" yet as various species of Cicadæ have been described by modern travellers, one can hardly suppose that any better quality than shrilly loudness can have belonged to the Tettix of ancient Greece.

We are told, indeed, by Madame Merian, that an insect of a similar description was called the Lyre-player by the Dutch in Surinam. The notes of a Brazilian species have been likened to the sound of a vibrating wire ; and those of another, in the swamps of North America, to the ringing of horse-bells. Similitudes these of sounds sufficiently agreeable ; but contrasted therewith, and almost drowning them, come the discordant comparisons of numerous other travellers respecting the same or insects of an allied species. One is called by Dr. Shaw "an impertinent creature, stunning the ear with shrill ungrateful squalling." The noise of a species in Java is described by Thunberg as shrill and piercing as

the notes of a trumpet; while Smeathman speaks of another common in Africa, which emits so loud a sound as to be heard at the distance of half a mile, or, when introduced into the house, to silence by its song the voices of a whole company. The mighty "waits" of the Fulgora, or Great Lanthorn Fly of Guyana, an insect not of the same but an allied family, has also obtained the name of "Scare-sleep,"—its din being likened to the sound of razor-grinding.

On the whole, therefore, it would appear pretty clearly that loudness is the main characteristic of the Cicada's song. Yet when we recognize, in this insect minstrel, the "Anacreontic Grasshopper," the "Son of Phœbus," the "Favourite of the Muses," the "Nightingale of the Nymphs," the "Emblem of perpetual Youth and Joy," the "Prophet of the Summer," we no longer marvel that its notes, however harsh, should have sounded melodious even in the ear of the polished Athenian.

To descend to present times and native performers, first, there is our own familiar and representative, the Hearth Cricket, for whose crinking chirp even *we* can scarcely challenge much intrinsic merit, yet do we regard it as a song, and a merry one; and why? because the faggot always crackles, and the kettle sings, if not in actual, in imaginative chorus.

But besides the sensations of involuntary pleasure which we have often owed, without knowing it, to Insect Minstrelsy, it affords matter for thought-inquiry, concerning the way in which it is produced. It is all of an instrumental and not vocal character; and, among the varied mechanisms of natural objects, the instruments of sound furnished to insect musicians are none of the least curious.

That of the celebrated Cicada (the classic lyre player)—an insect rarely seen in England, but still common in the south of Europe,—consists, as described by Réaumur, of a pair of drums fixed one on each side of the trunk; these are covered

on the exterior by two membranaceous plates, usually circular or oval; and beneath them is a cavity, part of which seems to open into the belly. These drums form, however, but one portion of a compound instrument; for, besides these, there is attached to another drum-like membrane in the interior a bundle of muscular strings; on pulling which, and letting them go again, a sound can be produced even after the animal's death. For the issue of this sound a hole is expressly provided, like the sound-hole of a violin, or the opening in the human larynx.

The chirp of the cricket, both of house and field, is said, by Kirby, to be produced by the friction of the bases of the tegmina, or wing cases, against each other, at their base; but these insects are also provided with their drums. In the large green field cricket¹ this drum is described² as a round plate of transparent membrane tensely stretched, and surrounded by a prominent edge, or nervure. The instrument is to be found in that part of the right wing-case which is folded horizontally over the trunk, and is concealed under the left, in which also there is a strong circular nervure corresponding to the hoop of the drum beneath. The quick motion with which these nervures are rubbed together producing a vibration in the membrane, is supposed to augment the sound.

What we call familiarly the singing or chirping of grasshoppers and locusts, is outwardly produced by application of the hind shank to the thigh, rubbing it smartly against the wing-cases, and alternating the right and left legs; but these, as well as the cicada and the cricket, are provided with their "petits tambours,"—membrane-covered drums, or cavities of somewhat varied construction, to augment the sound of exterior origin.

Be it here observed that the above-named professors of the "joyeuse science"—the cicada lyre-players—the crickets of

¹ *Acrida viridissima*. (Vignette).

² By De Geer.

our field and household bands—the roving grasshopper troubadours, are all, like the feathered minstrels of grove and garden, of the masculine sex; each doubtless playing his mid-day sonata, or evening serenade, with intent mainly to tickle the ear and fancy of his listening lady.

On the muteness of the latter was founded a sly joke on the Xantippes of antiquity, which is equally applicable both to scolding and to musical matrons of the present day. “Happy,” says Zenachus the Rhodian,

“Happy the cicadas’ lives,
Since they all have noiseless wives!”

The so-called “Horn” or “Trumpet of the Gnat,” would seem no wind instrument at all; its buzz, or hum, as well as that of other two-winged flies, appearing, says Kirby,¹ to be produced by friction of the base of the wings against the chest. This conclusion would seem, however, scarcely to be reconciled with the fact remarked by Rennie,² that they sometimes, especially towards autumn, fly in silence, although, when flying, the base of the wings must of necessity rub against the chest.

“The roving bee proclaims aloud
Her flight by vocal wings.”

So says the poet; and, in support of the accuracy as well as elegance of the dictum, he has the testimony of that careful naturalist Swammerdam, who opines that her humming proceeds from the wings alone, especially the small membranaceous pair at the shoulders, when played upon by air propelled from the subjacent air-tubes or spiracles, aided by certain adjacent cavities which open wide apertures under the wings. That the wings alone do not, however, produce the bee’s hum, seems sufficiently proved by an experiment of Hunter’s, wherein he found that after its wings were cut off the poor insect could still utter (as well it might) a shrill

¹ Introduction to Entomology.

² Insect Miscellanies.

peevish sound; and the same is confirmed by the silent flight of many insects of the same order.

Speaking of the hum of bees, which, though monotonous, is, through association, one of the most delightful of all insect harmonies, Kirby remarks, "that it ceases when she alights; that of the wasp and hornet is more sonorous. The combination of humble-bees may be heard from far, gradually increasing, till, when in its wheeling flight it passes close to the ear, almost stunning it by its sharp, shrill, deafening sound."¹

The buzz of flies has been supposed to arise from the striking of their wings upon the air; but this would seem disproved by the silent progress of many other rapid fliers, such as the dragon and crane flies; also by the power of some to produce a loud buzz when not upon the wing. Rennie² cites, as an example, the buzz of a wasp-fly, when resting, apparently motionless, on the window. Upon close observation, a vibratory tremor, similar to that of a harp-string, though so rapid as to be almost invisible, was perceptible in its wings; and when these were laid hold of, the sound ceased. It is supposed by the same author that this sound was not referable, simply, to any muscular movement, but that it must have arisen either from air playing on the membranaceous edges of the wings at their origin, as in the case of an *Æolian* harp-string, or by the stroke or friction of some internal organ upon the roots of the nervures.³ The drone of the dung beetle, the "*Drowsy Dorr*,"⁴ which, in the still twilight of a summer's evening,

— "Come brushing by
With buzzing wing"—

owes also its origin to friction,—that of the wing-cases upon the base of the wings. Loud hummers of the same order are the musk-beetle, the cock-chafer, and the beautiful green chafer

¹ Introduction to Entomology.

³ In *Insect Miscellanies*, p. 91.

² In *Insect Miscellanies*.

⁴ *Vignette*.

of the rose, which never fails, in alighting on the bosom of his favourite flower, to salute her with a wing sonata of delighted homage.

The tones of insects, as well as the songs of birds, have been deemed worth the trouble of notation. Gardiner, in his "*Music of Nature*," tells us that the gnat hums in the note A on the second space; the death-watch calls (as the owl hoots) in B flat, and is answered in G; the three notes of the cricket are in B; the buzz of a bee-hive in F; that of the house-fly in F in the first space; the humble bee an octave lower; the cock-chafer D below the line.

Although in no case proceeding from the mouth, the sounds we have been hitherto regarding as instrumental music are no less to be considered as a veritable language, serving, in lieu of voice, to communicate information and express passions, such as fear, anger, pleasure,—above all, love, that ruler of the rest, which with insect no less than man may be justly denominated the "*Soul of Song*."

There is a peculiar sound often heard issuing from a bee-hive previous to its sending forth a swarm,—a sharp, clear hum, produced, seemingly, by the vibration of the wings of a single bee. This has been interpreted into an harangue uttered by the young queen, and intended to inspire a portion of the community with courage to go forth, and colonise a new empire. On the conclusion of this inspiring address, her tone changing to one of supplication, aided even by groans and lamentation, she has been supposed, turning from the people, to address the queen mother of the hive, and, as candidate for a new throne, entreat her permission to lead the division about to emigrate. This, at least, is the purport of the royal speech, as translated by the ear and pen of Butler, who wrote of music as well as of the "*Female Monarchie*;"¹ of the latter with such marvellous minuteness as to draw a

¹ *Female Monarchie of Bees*, 1634.

poetical apostrophe to the effect that he must have been admitted into the counsels of the hive.

We are not called upon certainly to give implicit credence to all that this initiate in bee language has imparted of its meaning, nor shall we positively assert, with Godart, that there is in every nest of humble bees a trumpeter, who at early morn, ascending to its summit, sounds a *reveillé* with its vibratory wings of a quarter of an hour's duration. But we have plenty of common evidence, plain even to our common perceptions, that insects can make audible their anger and their fears. These we may hear intermingled in the sharp, impatient scold of the first humble-bee we may venture to imprison for a moment in the hollow of our closed hand; and we may listen to the fly's expression of intense terror, in the peculiar screaming buzz which she utters, when—and *only* when—in the grasp of her arch-enemy the spider.



The classic Cicada, the grassy Gryllus,
and the deep-toned Dor.



Conspicuous in the foreground is the "Carpenter" Caterpillar of the great Goat Moth (*Cossus ligniperda*), issuing from its woody cocoon in the hollow of an oak. Various Moth Caterpillars of those called "Tent-makers" (*Tineidæ*), perambulate, under cover of their portable pavilions, the oak-leaf, just over the "Carpenter's" cocoon. Above that, hangs another oak-leaf, cut and rolled by some caterpillar in form of a barrel button. The hazel-leaf, higher and beyond, cut across its middle and rolled spirally, in form of a pendant tassel, is the work of a small caterpillar, which becomes a variegated, greenish Moth. To the left, on a spray of elder, is a walking-branch caterpillar, of the Swallow-tail Moth (*Ourapterix sambucaria*), suspended for transformation, in a cradle composed of silk and pieces of leaf. On the other leaves of the same shrub, a "Leaf-Miner" and a "Leaf-Roller," both Moth caterpillars, have exercised their respective crafts; a white serpentine track marks the presence of one, a scroll with silken holdfasts that of the other. On the top of the wall, and composed of grains thence detached, are two little pyramids, built and occupied by tiny caterpillars called "Stonemasons," from the material thus employed.

MOTHS AS OPERATIVES.



WE believe it was Réaumur, who, with the lively fancy of his nation and character, first thought of arranging certain caterpillars, as well as some of the *solitary* workers among wasps and bees, into the several crafts of "Stonemasons," "Carpenters," "Tent-makers," "Muff-makers," "Flask-makers," and "Miners."

With respect to the solidity if not the ingenuity of his fabric, let us begin with the 'Stonemason.'¹ He is the caterpillar of a little moth with wings of gilded bronze, smaller, but much resembling the clothes-moth, whose family name (*Tinea*) he also bears, although in habits and locality, as well as the material of his workmanship, he stands widely contrasted with the destructive of the wardrobe. Instead of reposing, like the latter, in "Lady's Bowre," encased in garment of wool, or silk, or down, and regaling on the same soft and delicate substances of animal derivation, our hardy little operative finds himself, on emerging from the egg, exposed without protection on the surface of some lichen-covered wall. Instructed, however, by that kind Power which in this very lichen provides him with an ample store of provender, he knows perfectly well how to meet the other exigencies of his exposed position. Of what avail to him would be a silken or a leafen tent, liable to be overset and borne away by the summer breeze? A stone-built tower suits his purpose better; and such is the structure he proceeds forthwith to erect. By help of "tooth and nail," he detaches small particles of the stone or brick with which the wall supplies him,—binds them together with silk and a sort of natural cement, possessed in common with his kind,—and thus, after four-and-twenty hours

¹ Vignette.

of incessant labour, completes for himself a habitation of sugar-loaf form, just large enough for his comfortable accommodation, and under cover of which he proceeds to perambulate his world of wall, and regale on the vegetable viands with which for him it is bespread. When the caterpillar portion of his life is over, and he is about to enter on that quiescent state which precedes the development of his perfect form, he attaches to the wall, by silken cables, the hitherto moveable tenement which has accompanied his rambles. Within the interior of this now immoveable pyramid, he becomes a chrysalis, and then, leaving it behind (a self-erected monument and tomb of his remains), he ascends on his bronzed and gilded pinions through an opening left for the purpose at the top.

From their employment of a material next in solidity to stone, namely, wood, the "Carpenters" among moth operatives would seem best placed after the "Masons," although widely contrasted with the tiny builders last described both in size and habits. At the head of this carpenter craft stands the Cossus, or caterpillar of the Great Goat Moth¹—a large, smooth, unsightly crawler of a lurid red and salmon colour, black-headed and black-clawed, whose extensive galleries, chiselled through solid trunk of willow, oak, and poplar, attest him to be a mechanic of only too much industry. In Middlesex and adjacent counties he drives especially a most flourishing business. A carpenter is said to be "known by his chips;" but the artizan in question, as if aware that his operations are all trespasses, swallows (after the fashion of some detected thieves) every particle of the saw-dust and shavings which his trenchant jaws produce. In summer he is content thus to proceed working and eating his way through the winding wooden tunnels which afford him sufficient shelter against all enemies—wind and weather included; but as soon

¹ Vignette.

as the gales of autumn whistle through the thinned branches of the trunk he inhabits, he begins to provide himself with a more seasonable habitation. With this intent he widens a portion of his gallery into a roomy chamber, and, no longer satisfied with bare wooden walls, proceeds, by the exercise of his native skill in weaving, to hang them with an impervious tapestry, composed of the raspings of wood scooped out of the cell and united with strong silk. In this snug dormitory he passes the winter, in an idle fast, to resume his labours and feed with the return of spring; for this master Carpenter is a long liver, working, and literally living by his work, for the space of three years. At the end of this period he casts aside his working (or caterpillar) garb, and after an aurelian slumber, passed in a summer cell, lined with a lighter tapestry than that occupied in winter, he thence emerges a dark-brown beautifully shaded moth.

As the greatest Emperor of Russia was all the greater for having once been, by choice, a shipwright, so the great "Emperor" of moths is all the worthier of note for being always, by birth, a "Flask-maker." The art by which he works his way to the royalty of his winged estate may perhaps be more properly considered as that of weaving. Having prepared for his labours by feeding on the tree, usually a willow or black thorn,¹ which sheltered the infancy of his caterpillar life, he begins, towards September, to prepare himself a private chamber, but of no common construction, for the mysterious process of transformation. The peculiar excellence of this royal cocoon consists, firstly, in its texture, which is of silk, so thickly woven as almost to resemble leather; secondly, in the elegance of its shape, which has been compared to that of a Florence flask; and thirdly, in its singular and ingenious formation. Instead of being wholly closed, like the cocoon of the silk-worm and most others, this has a

¹ We have had a specimen found and fed upon the *strawberry*.

small circular aperture formed at its upper end, by the convergence of elastic narrow points. When the time arrives for his coming forth, the winged Emperor has only to push against the elastic points above him, which thus opened, reclose after his egress, and leave the flask-shaped tenement entire and unimpaired.

From this imperial, flask-making weaver, we descend (an abrupt transition) to the tiny tent-maker, which, though tabernacled in the frail tissue of a piece of leaf, belongs to the same *Tinea* family as the sturdy little mason whom we have seen to build himself a tower of brick or stone. Those who in a green leaf, or a leaf turned yellow, are accustomed to see a leaf and nothing more, will acquire enlarged conceptions even of a single leaf, when led to consider, that while to some among the insect million it furnishes an extensive plain, to others, it is absolutely a tented field.

The elegant and curious erections of these tent-making caterpillars are commonly to be seen on various forest and fruit trees, especially the elm, oak, hawthorn, and pear, of which the leaves furnish them at once with food, and material for the construction of their habitations. They are usually about a quarter of an inch in length, and being formed out of pieces of leaf assume, as they wither, a *feuille-morte*, or golden hue.¹

There is commonly to be seen about Midsummer, upon leaves of oak, hazel, dock, and other plants, what, on a cursory glance, appears a bundle of little bits of stalk and straw accidentally collected and combined. On looking closer we find, however, that the pieces are arranged longitudinally side by side, and much too regularly to have come together haphazard. We shall perceive also that among several of these Lilliputian faggots, some are fixed perpendicularly to the leaf, while others are in motion over the surface. The latter are

¹ Vignette.

attending the progress of their occupants, each a small prettily-striped caterpillar, which, with head and shoulders protruded, thus travels under cover of what we may call a tent of sticks. The sticks, however, which cover its exterior, form in fact only a protecting palisade attached to a silk-woven central case, the real tent which surrounds the body of its ingenious architect.

The "muff-makers" among moths do not show as much ingenuity as the moths among muffs in the manufacture of their body coats; but they display even superior tact and shrewdness in the appropriation of a ready-made article, admirably adapted to serve their turn. The muffs in question are of vegetable fur, that short silky down which clothes the seed-catkins of the palm-willow, and is often chosen by a certain moth caterpillar to clothe himself. With this felonious intent, he burrows into the seed for the protection of which the furry coat was originally designed, lines it with silk, detaches it from the parent stem, then walks away, clothed *à la Russe*, to the annihilation of some incipient willow. These vegetable muffs, with their insect appropriators, are sometimes found floating on the water beneath the pilfered tree, and it is suggested by Rennie that the buoyant material of this muff-like tent might be intended to furnish its little occupant with a life-boat when blown from off its native willow.

There is another and numerous company of caterpillar artisans, which, from their mode of leaf appropriation, have been designated Leaf-rollers. Though the labours of this industrious class do not correspond (like the above) with any particular craft of human exercise, they are much too ingenious, as well as in their aggregate of mischief too important, to be passed over without notice, either here or within "their green shops"—the gardens, hedges, forests, where throughout the summer they are to be seen incessantly at work.

There is scarcely a single tree or plant which does not afford material for some caterpillar of the leaf-rolling crew, which,

according to their species, are accustomed to exercise their ingenuity in forms of infinite variety. That of the simple scroll¹ is very commonly exemplified in the leaves of the lilac and the oak, almost as soon as they expand. These are formed by rolling the leaf from its extreme point towards the stalk,—an operation which the caterpillar is only enabled to accomplish by the aiding exercise of its art of weaving, since it is by silken threads attached to the leaf that he contrives to pull it into the desired form, wherein it is retained by silken braces. These hold-fasts, which to the roll of the lilac-leaf are comparatively slender, are numerous and strongly doubled in that of the oak, to meet, seemingly, the greater resistance of its stiffer fibre. The leaf-rollers which thus presume to bend to their purpose the foliage of the forest's monarch (and that often to a prodigious and most mischievous extent) assume, in the month of June, the shape of little green moths,² which, pretty and innocent as they look, are progenitors of caterpillar marauders resembling those which they have been themselves.

Portions of leaves, as well as entire ones, are sometimes employed in the operations of leaf-rolling caterpillars, which, in these instances, using their jaws with all the precision of well-directed scissors, manage to cut out, but without entirely cutting *off*, a piece of material shaped exactly to their purpose. A worker of this description is a little smooth greenish-white caterpillar, which, out of a piece of sorrel-leaf thus excised and not detached, forms a sort of conical pyramid, composed of five or six enwrapping folds. Having cut out the required segment, the cunning artificer rolls it slowly up by means of threads attached to the surface of the leaf, “and then, having cut in a different direction, *sets the cone upright by weaving other threads attached to the centre of the roll and the plane of the leaf, upon which it throws the weight of its*

¹ Vignette.

² *Tortrix viridana*, (green oak moth).

body.”¹ After having devoured the interior folds of this ingeniously constructed cone, its little inhabitant, still protected by the exterior walls, weaves within it a silken cocoon, and undergoes his final transformations.

A June ramble in Highgate wood furnished us, last summer, with two most elegant specimens of the leaf-rolling combined with the leaf-cutting art. A number of young oak-leaves having been each roughly cut across the centre from the edge up to the mid-rib, the half comprising the tip was formed into a hard compact roll, of exquisite neatness, closely resembling a barrel-button.² In the centre of each was a bright yellow egg, but how it had got there (seeing that there was no visible opening for the ingress or egress of its layer) was and remains a question as puzzling to us, as, according to Pindaric record, was once to royal brains the advent of the apple in the dumpling.

In the same wood, on the same day, we noticed certain leaves of the hazel, cut and rolled in a form much more graceful if not more curious than the above. These leaves, as those of the oak, were severed, only more smoothly, across their centres, the main stalk alone being left undivided; but the terminating halves, employed by the little artificers of the oak to form their barrel-buttons, were, in this instance, simply rolled or twisted into a spiral form, so as to have the appearance, in their suspension by the mid-rib, of an ear-drop, or a pendant tassel,—the serrated edge of the hazel-leaf adding to the elegance of their appearance.³ With one more specimen of the skill of Leaf-rollers we must close our brief notice of their ingenious labours. On a cabbage rose-bush, at Hornsey, we observed, in June of last summer, a case of horn-like shape, wide and open at top, and pointed at bottom, formed out of a leaf of the same shrub, twisted spirally, and suspended by silken strings to the main stalk of a group of young leaflets.

¹ Insect Architecture; also Réaumur.

² Vignette.

³ Vignette.

One of the latter, nearest to the mouth of the pendant horn, displayed recent marks of excising jaws; and presently, protruding from the open end of this curious leaf-case, appeared the head of a green Caterpillar, which, thus protected, resumed its juicy meal.

Having gained possession of master Leaf-roller and his ingenious tent, by cutting off the branch to which they were appended, we placed it in a flower-pot filled with mould, and when the twig withered took care to plant beside it a succession of others. To these our tabernacled feeder never failed to transfer himself and habitation, slinging the latter, as we originally found it, close beside the leaf of his pasture. Increasing in bulk and length as he thus regaled, he soon outgrew his twisted tenement, which he then cleverly contrived to lengthen by the addition of a piece of fresh leaf nicely joined and fitted to the larger and upper end of the spiral horn. Thus far, and no farther, can we carry, from observation, the history of this artificer in rose leaves; for, supposing that when his caterpillar life approached its close, he would either quietly spin himself up in his case, or bury himself in the earth of the flower-pot, we trusted too confidently to his apparently non-roving propensities, as was proved one fine morning in July, when we found our Leaf-roller absent without leave,—his habitation being left (vacant) behind him. That, barring accidents, he subsequently became a moth, there is every reason to believe from the nature of his constructive labours while a caterpillar.

Lastly, a word or two about the Leaf-miner; he, like the Leaf-roller, and the Leaf-tent-maker, holds his verdant estate by the slight tenure of a fragile foot-stalk; but compared with theirs, indeed without comparison, his lot seems a highly favoured one. His path, a covered way, is through a leaf, often of the rose; and each step of progression (for labour he has none) would seem an act of self gratification, as the little Sybarite, lodged between the upper and the lower membranes

of the leaf, eats onwards through its soft green pulp, from the point whence he issued from the egg even to that which terminates his caterpillar career. Thus eating and progressing, he produces, by removal of the excavated pulp, a visible track, appearing on the leaf's surface like a broad white tortuous line, with a dark one running through its centre.

On first waking into life, the leaf-miner finds himself, through the exercise of maternal care instinctively and prospectively employed, placed on the surface of his green patrimony,—the leaf exactly suited to his appetite, into the depths of which (a depth comprised within the thickness of a sheet of paper) he at once plunges,—pursues, for his appointed span, his safe and luxurious way,—then, in a quiet little plain or dell, which forms the termination of his “happy valley,” passes the period of his aurelian slumber, to emerge thence a minute moth.



Head, amongst caterpillars, of his craft.



Seated on the stripped willow-branch to the left is the grotesque caterpillar of the Puss Moss (*Cerura vinula*), the Moth itself being figured beneath. Below appears the singular masked larva of a Dragon-Fly. The centre of the foreground is occupied by a Dor or Clock Beetle (*Geotrupes stercorarius*). To the right appear the head and shoulders of another common insect of the same order—the Oil Beetle (*Proscarabæus*); and above and between these, with wings extended, is a Devil's Coach-horse, or Rove Beetle (*Staphylinus olens*). Attached in sphinx-like attitude to the right-hand branch, is the beautiful caterpillar of the Privet Hawk-Moth (*Sphinx Ligustri*).

A SUMMER DAY'S DREAM.



T was a sultry day in August.—Well, nothing could be more generally characteristic of “still life” than the day and hour, about a year ago, when, book in hand, we crept from our little sun-baked domicile, and throwing ourselves under the shade of a huge helm-pollard, plunged

not, we confess it, into our provided volume, but into a reverie about as drowsy and dreamy as the heated face of Dame Nature. And here we must notice, that, while all the other children, animal and vegetable, of our nursing-mother Earth, were taking their noontide slumber on her lap, one portion of her family, that, namely, composed of the insect crew, seemed resolved to keep the world stirring, or at least to make a stir in the world, whose sunny places seemed to be entirely abandoned to their use. These little impertinents, the pipers, and eke the dancers of the hour, seemed, in truth, to have taken complete possession of three elements—air, earth, and water—together with a large portion of the fourth, diffused through all by the fiery sun; and, in thus possessing, gave apparent life to the elements themselves, making them reel again with insect

“Mirth and revelry,
Topsy dance, and jollity.”

We might have repeated appropriately, from the volume in our hand,—

“Oh! qui n’eut partagé l’ivresse universelle,
Que l’air, le jour, l’insecte apportaient sur leur aille?”

“This glad ebriety who could but share—
The winged mirth of insect-season—air?”

The intoxication of the day was with us, however, entirely of the somnolent character, and we had already closed our eyes on the bulkiest moving object within our range of sight—namely, the lashing tail of a solitary cow, ruminant in an adjacent pond—when we were startled by a light footstep on the back of our hand. It was not exactly a fairy who had come to visit us; but it was a little creature, both in form and attire, of most fairy-like seeming. It was none other, in short, than a lace-winged fly,¹ the most graceful insect of its

¹ Vignette to “Fair and Fierce.”

elegant and graceful tribe. "Truly," said we, as we looked upon her gauzy wings of delicate green, mingled in their iridescence with rainbow hues—"truly it is a pity, my little lady, that there's so precious little of you; that all this tissued bravery, and even those eyes of gold, should, only for lack of size, be overlooked by nearly all other eyes, save those only of some lace-winged lover, who for beauty, perhaps, may have no eye at all!" Our winged fair-one had, at all events, no ear for admiration expressed in (to her) an unknown tongue; for before our complimentary address was ended she had disappeared.

Only suppose, thought we, pursuing the train of fancy brought and left behind by the gauze-winged sylph; suppose that, by the touch of some Circe's wand, all the insect forms creeping and flying and floating around us—now less *seen* than *heard* and *felt*—were all at once enlarged to the proportions they assume to the eye in that amusing raree-show, the solar microscope—verily we should feel somewhat ill at ease in the strange company wherein we should figure then—as insects most insignificant—as performers playing certainly no first fiddle.

"Gorgon and hydra and chimera dire"

would not then exist only in the realms of imagination; but fill to suffocation the atmospheric and the aqueous fluids, and walk in appalling reality on the solid earth. And amidst the crowd of shapes terrific, small, we take it, would be our inclination to single out for admiration such among them as our lace-winged *élégante*; or, with the poet, to admire in

"The beetle panoplied in gems of gold,"

the semblance of

"A mailed angel on a battle day."

At this moment a host—not of angels, but of blood-thirsty

demons in the shape of gnats—rose from the adjacent pond, and passed across our face. Using our book as a weapon of destruction, we felled a multitude to the earth; and, in completion of our angry purpose, trampled many of our fallen victims into the dusty ground. Scarcely had we done the deed, when something like a qualm of conscience, arising partly from our penchant for gnats before recorded, partly from the magnifying turn our thoughts had taken, shot through our heart. It passed, however, as rapidly away as the remnant of the insect host, whose enjoyment we had so murderously interrupted; and in a few minutes the drowsy incubus which had so long hovered over our head fairly wrapped us in its leaden wings—in short, we fell asleep. Still our waking fancies followed us. It seemed as though one of the gnats we had just exterminated rose from the ground, and, poised in air on a level with our face, set up a shrill hum, which presently assumed the distinctness of angry high-toned speech. “By what right,” cried the little apparition, “didst thou cut short the thread of my joyous life?”

“Because,” answered we, “as one of creation’s lords, we have the privilege of destroying everything that invades our peace.”

“And by what right art thou a lord of creation?”

“By the right of reason.”

“Reason!” exclaimed the insect ghost; “say rather by right of *size*. Only let my stature equal thine, and see which would then possess the mastery!”

As the winged phantom thus addressed us, her tiny form expanded; her long hairy shanks stretching downwards reached the ground, and upwards waved like spectral arms above our head; her enormous eyes, motionless and prominent, seemed bursting with malignant spleen; her antlers quivered with rage, and, pointing towards us her blood-extracting weapon, straight and long as the stiletto of an Italian bandit, she seemed about to plunge it in our heart! We started to our

feet in terror ; and at that instant a sudden gloom, as of coming twilight, overspread the sky, while a flapping as of the canvas of ten thousand vessels proceeded from a winged multitude, monstrous now in bulk as in number, which filled the air. Attempting to escape, we nearly tumbled over—not a stone, but an enormous beetle (bigger than the biggest turtle ever captured on the shores of the Antilles), and only regained our footing to tread upon the loathsome yielding body of a caterpillar swollen to a serpent's size, and rolling its mutilated length about our ankles. All around, the darkened daylight presented only similar objects, half-revealed : ground, grass, flower, shrub, and tree, all laden or crushed by living masses through which we had, if possible, to force our way in order to gain the shelter of our roof. Armed by desperation, we continued to advance ;—and what an advance it was ! Pierced by poisoned arrows, swords, and spears, in the shape of what, as stings, we once despised—lacerated by forcep-jaws armed with shark-like teeth—bruised by violent contact with the mail-clad limbs of grasshopper Goliaths and beetle Bevis's—deafened and bewildered by sounds most strange and threatening, and of volume augmented in proportion to their utterer's bulk—we ran the gauntlet through this infernal crew, and at length, when almost exhausted, reached our door. But entrance was even then not easy, for our portal was barricaded by thick silken ropes stretched across it in all directions. Unable to break, we contrived to sever them with our pocket-knife ; but (horror of horrors !) no sooner were the cords divided, than rapidly descending by one of them which hung loose above our head, a spider, big as a baboon, alighted on our shoulders, and made her long hairy legs meet around our neck. By a desperate effort we threw off our disgusting burthen, and, opening the house-door, shut it with all possible celerity ; but one of the spider's arms, stretched out to renew her grasp, crackled like a lobster's claw as we jammed it betwixt door and door-frame. As we entered our parlour a

deafening buzz was our first salutation, and the daylight, obscured as it was without, could here scarcely penetrate at all by reason of a swarm of gigantic flies, which, unable to find room in the window, were crowding in double and triple ranks around it. Hastily retreating, we descended to the kitchen; but here—how shall we proceed? We had escaped with life from the hideous assemblage through which we had achieved a passage. We had managed to avoid the fangs of the murderous bloated creature which had fastened upon our door, and then fastened upon us. We had shut her out, and we had shut in the swollen sickening blue-bottles; but what we had left behind was nothing to what awaited us—an appalling horror which we shudder to describe. On entering the kitchen we saw not a living thing, not even Martha—old Martha—our faithful factotum, upon whom we called, albeit in a trembling voice, fearful to attract the notice of some hidden lurker amongst our new and hideous enemies; but no Martha replied, as expected, from the scullery; and, with a dread of we scarce knew what, well nigh exhausted also by terror and exertion, we sat us down in her arm-chair. The sky was still partially obscured by monstrous creatures on the wing, and evening was now approaching, so that there was little light in the apartment but what proceeded from the fire, which had burnt very low. We had not been seated long before we were startled by a slight noise proceeding from one of the deep and dark recesses on either side of the chimney; and, on looking into it, we could just discern, indistinctly, some moving object. What this might be we dreaded to ascertain; but with a shaking hand we lighted a candle by the dying embers, and held it up within the recess. Then, oh! the spectacle that we beheld! Supported by her enormous web—a tissue of mingled cable—sat an elephantine spider, to which our assailant at the house-door was a mere pigmy,—a spider of most hideous aspect, her eight glassy eyes sparkling with greedy ecstasy as she gorged upon a fresh-caught, fresh-killed victim, and that victim no

heedless, idle fly, but, alas! that busy bee, Martha—our faithful Martha! For a moment we stood horror-stricken; then, armed by rage and grief and the kitchen poker, we rushed upon the loathsome murderess, who, intent upon her prey, heeded not our approach, and, with a single blow, brought her bloated body lifeless to the ground, that of her victim falling with it.

What a night of terror did we pass, holding our vigil by the dead; but we held it not alone, for beside poor Martha's hearth, mocking or mourning its desolation, sat a monstrous cricket, piercing our ear and heart with his shrilly chirp; while at intervals—loud as the ticking of a church-clock—rose the warning click of an enormous death-watch.

We heard no more—our heart sickened—our head swam—our powerless arms quitted their hold—and we fell——into the insect monster's devouring jaw? Not a bit of it, dear reader. We only fell (having suddenly awoke) from the appalling position to which our sleeping fancy had raised us, to the flowery bank which had been our bed beneath the old elm pollard.

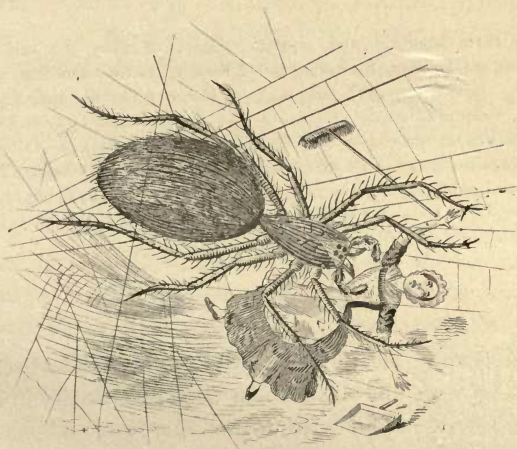
“What a precious extravaganza!” we mentally exclaimed, as sitting up we recovered a joyful consciousness of the realities around—the pleasant realities of a summer's evening—for the sun had declined, and a refreshing breeze was waving the silken, silvery heads of the reeds below us.

We are no interpreters of visions — our own or other people's; but being, in our way, a sort of utilitarian, we have always fancied that dreams (not merely those which would seem sent expressly for reproof or warning, but dreams in general) may be made available to good by the process of recalling and turning their purport over in our minds, even as we should muse habitually over our waking thoughts; a mental exercise than which, according to philosophers, there is none more useful.

With a view to some such purpose of improvement, we

thought over, as we walked homewards, the late vagary of our napping fancy, and were not long in deducing from it some admiring reflections on the nice proportion as to *numbers, size,* and *power*, preserved through every order of creation; a proportion to destroy which, in any one department, would be to bring destruction upon all.

This conclusion and our own threshold we reached at the same moment, and then occurred to us a subordinate and domestic purpose, to which our recent dream was also applicable. "I'll tell it, or a part of it, to Martha, and perhaps through very fear she will grow more lenient towards the spiders, and I shall hear less of her incessant broom!"



"That victim no idle fly"



The three beautiful and rapacious insects forming the subject of this vignette, are Dragon, Scorpion, and Lacewing Flies. The first, a small and common species (*Agrion*), rests upon a hedge while discussing its cannibal repast, a captured gnat. Hovering just above is the Dragon-Fly's enemy, and sometimes conqueror, the Scorpion-Fly (*Panorpa*), so called from the appendage to its tail. To its left appears the graceful Lacewing (*Hemerobius*), green and golden-eyed; the rose-leaf to the right, below, being occupied by a grub, or larva (magnified), of the same carnivorous insect busy in its usual occupation of destroying *Aphides*.

FAIR AND FIERCE.



HERE are now to be seen almost everywhere, hawking about lanes and hedges in search of prey—fair as the sunshine, and fierce as its meridian rays—three insect families of the Linnæan order *Neuroptera*, which are well worth observing for their beauty, and studying for the pecu-

liarities of their economy. These comprise *dragon-flies*, *scorpion-flies*, and *lace-wing flies*; the former, from their imposing size, well known by sight to everybody; while the two latter, though both, especially the lace-wing, of surpassing elegance and beauty, are as commonly overlooked, on account of their comparatively inconspicuous size.

To begin then, in deference to their superior magnitude (which in some species constitute them the largest of British insects), with the dragon-flies, popularly called by the French "*Demoiselles*," partly, perhaps, in compliment to their beauty, partly as a satire on Amazonian propensities. By the ignorant among ourselves they are known as "horse-stingers," a complete misnomer, seeing that the blood wherewith they delight to moisten their carnivorous jaws is never, by any accident, taken from those warm red streams which flow through the veins of beast or man, but consists of that colder, whiter fluid, which pervades the tender frames of butterfly and case-fly—the innocent creatures they are ever seeking to devour.

Since our readers may not, just at pleasure, be able to capture a living specimen of the large *green dragon-fly*,¹ now so abundant, let them look, *en attendant*, at one of a smaller species² depicted by our pencil. Though a minim of his kind, is he not a glorious yet formidable looking creature? Mark his four large ever-expanded wings of glassy membrane, with their beautiful lace-like nervures, not distributed for mere adornment, but in every meander serving as channels for the circulating air, which, thus spread over the surface of the pinion, confers on this insect a marked pre-eminence in power and permanence of flight. Observe his straight, slender body—so long and light—contrasting with his muscular chest and bulky shoulders, fit receptacles for the insertion of those powerful pinions; and the legs, six in number, strong and rigid, and armed with claws. But notice, above all, the head

¹ *Eshnu varia*.

² *Agrion*.

—the round enormous head—nearly the whole of its upper half occupied by large prominent eyes, which, in their crystalline transparency, differ remarkably from the generality of visual organs among insects, with their lifeless appearance of dull opacity. In these there is no lack of vivid expression, as the numerous hexagons of which they are composed seem to be for ever in motion, now appearing visible, then seeming lost beneath their translucent common covering or cornea. With the threatening animation of these rapacious-looking eyes, the mouth and powerful jaws are in formidable accord; and if, in the sight of its insect victims, this veritable dragon of their tribes wears anything like the aspect he bears in ours (his terrors magnified by superior size, and perhaps, also, by instinctive dread), with what trepidation must defenceless case-flies flee before him, and what a panic must be created by his very shadow amongst a bevy of white-robed butterflies, when assembled, according to their wont, in a water-drinking party round a pond. Well may ye tremble, ye harmless sippers, at the approach of this, your arch-destroyer, as ye catch the sound of his rapid flight—audible, perhaps, to your delicate antennæ, though silent to our coarser ears! Well may ye rise in terror and confusion, when ye behold his terrible image reflected, with your own fair forms, upon the surface of the liquid mirror at your feet! But little will your feathered wings avail you when matched in flight against his bare and nervous pinions. Whether you await or endeavour to escape him—whether at rest or in the air—he will pounce upon you, tear off, without mercy, your painted pinions; and, when reduced to a disfigured mutilated trunk, bear you off in triumph to the first convenient resting-place—some bough or paling—there to glut his maw upon your honied juices, while repose gives him new vigour for the pursuit and massacre of others of your race!

Such is the dragon-fly in his form of maturity, and, even in his earliest stage—that of a crawling, wingless grub,

groping in the mire, or swimming through the water of the pond over which he subsequently soars, he exhibits the same savage propensities, only modified by form and situation. He is, in short, "a murderer from the beginning," distinguished for remarkable rapacity, with endowments yet more remarkable for its gratification. These we have already noticed under our head of "water-devils," amongst which, while a grub or larva, the dragon-fly figures as a very Beelzebub. In the present month (August), and on to October, the large green dragon-fly¹ is commonly seen on the wing, in sunshine, near streams and hedges, or found resting, of an evening, on water-plants or low bushes.

We have spoken of the dragon-fly's four powerful pinions as always open, in readiness for flight. This is generally the case with the families of *Æshna* and *Libellula*; but in some, the wings, when at rest, are applied to the body, as in the instance of a very common but very pretty little species,² with bodies variously coloured (as blue and black—red and black—green and black) which are, in most places, numerous over ditches in May and June; in which months another species (the large black and yellow), is also not uncommon. About two hundred different kinds are said to haunt the woods and streams of Britain.

From the dragon-fly—the above redoubtable giant among English insects—we come, by no very abrupt transition, except in the great difference of their bulk, to the scorpion-fly,³ a lesser but no less striking specimen of the "fair and fierce." It would even seem that with reference to the quality of fierceness, or more properly of valour, this latter insect is well worthy of precedence over its bulkier class-fellow, of which, being invariably the foe, it is not unfrequently the conqueror. Only look at these enemies by nature, the great dragon and the little scorpion flies, in juxta-position, and, on comparison

¹ Figured with its puparium in the Vignette to "COMING OUT."

² Of this is the insect figured in Vignette. ³ *Panorpa*, also in Vignette.

of their respective sizes and apparent powers, you will hardly admit the possibility that when opposed in single combat the latter should come off victor. Yet thus it stands recorded in the chronicles of insect doings, wherein, on good authority, it is written that the tyrant of our lakes and pools (cowardly as tyrants are wont to be) is terrified even at sight of a scorpion fly assailant. One of these valorous pygmies is related by Lyonnet to have attacked, in his presence, a dragon-fly ten times its own size—to have brought it to the ground, pierced it with its sharp proboscis, and have left it with life only through the interference of the naturalist spectator.

This insect “hero of a thousand fights” bears in his tail a formidable-looking, sting-like weapon, which might seem mainly instrumental to victory in such unequal combats; but dangerous as this may appear, his nasal dagger, or stiletto, does him, we believe, the most good service both in attack and demolition of his bulky foes. He doubtless, however, finds a use for the appendage at his tail, and albeit we have found it harmless within our capturing grasp, its bearer owes the name of “*Scorpion-fly*” to its great resemblance outwardly to the deadly sting of the scorpion of tropic climates.

From May to November these pretty flies are everywhere common upon hedges and in gardens, where, with predacious activity, they make cruel sport under the summer sun, cooling down, with advance of autumn, into a milder state of comparative inactivity, which renders them an easy prey alike to bird and entomologist.

Last, in our trio of “the fair and fierce,” but for either attribute not least, comes the beautiful green and golden-eyed lace-winged day fly¹—like the daisy (day’s eye), loving sunny weather, and the most elegant perhaps of all insects upon which the sun (in Britain) ever shines—wanting only augmented bulk to render it an object of universal admiration.

The form of the “lace-wing” is always graceful—whether

¹ *Hemerobius* (vignette.)

at rest, with her ample folded wings, arching and sweeping, train-like, over her slender limbs and body—or whether by expansion of these her gauzy pinions, she displays to more advantage their most delicate workmanship—a net of nervures, interlaced over a thin transparent tissue, beautifully iridescent with varying hues of azure blue and rose colour. But above all may this insect-beauty, if she ever takes flattering counsel at a dew-drop mirror, pride herself on the peculiar lustre of her eyes—a metallic brilliance closely resembling that of burnished gold. There lurks, however, under these glittering orbs, as much deception (though of a much more harmless character) as belongs frequently to others—hazel, black, and blue. Their burnish is but gilding, being (like that on the skins of various chrysalides) produced only by an opaque varnish under the cornea.¹

With all her beauty, and all her seeming gentleness, she bears about her no odour of sweetness—on the contrary, an ill-conditioned scent; and could we but inquire of her character amongst insect nations, especially amongst the tribes of Aphides,² which people the waving foliage, we should find her name, amongst them, in worse odour even than her person. The very story that flocks might bleat about the wolf, or turkeys gabble of the fox, these aphides would certainly relate to us of the lace-winged fly. “She invades,” would they declare, “our verdant pastures, drains our blood, sometimes even dresses herself in the skins of our slaughtered brethren, and for this, as well for the harmless mien which cloaks her ruthless nature, may be looked on, not merely as a wolf, but as a wolf in sheep’s clothing.” Thus would say the little aphides; and the same character, with features somewhat enlarged, but by no means softened, we are compelled in justice to assign to their arch enemy, who, even before she has lacy wings to boast of, or golden eyes to look upon the day, begins her murderous ravages among their leaf-sucking tribes.

¹ See Painting, Carving, and Gilding.

² See article on Aphides.

But let us commence the history of the lace-wing at its beginning—even from the egg—which in itself presents (by the way) a tiny object too singular as well as pretty to be overlooked. There are to be seen, from May to August, attached to various leaves, but those chiefly of the rose tree, certain slender filaments, green or white, surmounted by an oval head, and arranged—sometimes, fringe-like, round the edge—sometimes in groups on the surface of the leaf—standing sometimes singly and distinct—sometimes with heads united in a cluster. These heads, with their delicate stalk-like appendages, are none other than the eggs of the lace-wing fly; but it hardly needs to be observed, that from no such minute envelopes could possibly emerge her winged descendants, which, like all nearly of the insect race, have to reach their perfect form through three successive stages of development.

Looking now upon the lace-wing in its earliest shape of animation, that of larva—a flat, wingless, six-legged crawler, wanting only size to make it frightful as well as hideous—we exclaim, “Can it be possible that an object so unsightly can contain within it the germs of grace and beauty?” Even so; and here, when without disguise—“*fierce*,” but not yet “*fair*”—we behold the wolf of aphides playing havoc amongst these flocks of foliage, which, with more than lamb-like passiveness, permit themselves to be individually picked out and slaughtered by their terrible but apparently undreaded enemy,—to her their green pellucid bodies, filled with saccharine juice, are so many honey-pots, which she knows well the trick of emptying (at the rate of three in half a minute) by means of her imperforate as well as pointed jaws. When thus reduced to skins, the spoils of victim aphides are frequently observed so heaped up around their destroyer as to seem purposely collected to serve it for a cover—a proceeding which Kirby has illustrated by comparing it to that of Hercules in clothing himself with the skin of the Nemean lion.

When our wolf of aphid flocks assumes the second form of

her existence, and becomes from an active grub or larva (correspondent to the caterpillar of *Lepidopteræ*) an inanimate pupa (the likeness of the chrysalis), she furnishes of course but slender matter for the historian of insects. Yet, even in this, her stage of passive transition, our "Lace-wing" in progress affords us something worth observing. After being wearied of aphid slaughter, whereon she has attained her full growth, her last active operation is to enwrap her body in a silken shroud or cocoon, spun previously, not after caterpillar usage by an apparatus at the mouth, but by one provided for the purpose at the tail.

Before dismissing our trio of the "Fair and Fierce"—the dragon, the scorpion, and the lace-wing flies—we must bespeak indulgence for their fierceness—not in favour of their beauty, but on account of the usefulness of their devouring propensities.



Gremble on the approach of your arch-destroyer.



The mimicry of vegetable by animal forms is here illustrated by figures of some looping caterpillars, termed "Walking branches," and by that of a moth, the Oak Lappet (*Gastropacha quercifolia*), likened to a Walking Leaf. Above the latter, fixed motionless to a branch of hawthorn, which it closely simulates, is the caterpillar of the Brimstone Moth (*Rumia crategata*), the moth itself appearing in flight above. On the left, another stick caterpillar—that of the Swallow-tail Moth (*Ourapterix sambucaria*), is attached to a branch of elder, of which it affords a close copy in form, colour, and markings. A second specimen of the same in its walking position forms an arch upon the branch below.

RESEMBLANCE AND RELATION.



THE last time we were in the public insect-room of the British Museum, our notice was attracted by a buzz of admiration raised by a cluster of a Monday's swarm gathered round one particular case of the entomologic collection. "Well, I never!" "Queer creatures!" "Neither

grass nor grasshoppers!" "How curious!" "Perfectly exquisite!" "What strange similitudes!" "Links between the animal and the vegetable," and so on, ascending.

The above notes of admiration, varied according to the mental compass of each observer, were drawn forth by different specimens of those curious tropical insects, known popularly as "Walking Leaves,"—an appropriate appellation, presenting as they do a perfect resemblance in form, colour, texture, and veining to vegetable foliage in every stage of progression, from verdant expansion to shrivelled decay. These strange copies, not of leaves only, but also of branches, are found in several insect tribes and families, but chiefly those of *Locusta*, *Mantis*, and *Phasma*.

Some of the tribe of Mantis—treacherous and cruel creatures, with long, desiccate, skeleton limbs—are like spectral anatomies of vegetable death—yet living and locomotive. But we need not visit India or China—or even the British Museum or other collections of foreign insects—to find similar resemblances, and sometimes such perfect ones between the insect and the plant that both would seem to have been cast in a common mould—then endowed, the one with an animal, the other with what Dr. Darwin would have called "a vegetable soul." To discover an English specimen of such curious similitude, we have only, in this present month of August, to shake some boughs of a hawthorn hedge over an inverted parasol or umbrella, into which will almost of a surety then fall some two or three living and moving sticks, or caterpillars of stick-like form,¹ quite as "queer" and closely imitative as some of the foreigners above noted. These strange little animals have a brown skin, wrinkled and furrowed just like the bark of the branches they are accustomed to occupy, with a forked protuberance on the back resembling diverging twigs or nascent thorns; while, to render his mimicry the more

¹ Vignette.

complete, this caterpillar sprig of the hawthorn, in common with others of branch-like semblance, is in the habit, when at rest, of stretching himself out stiff and straight, at right angles with the twig whereon he reposes; and thus remaining for hours motionless, supported only by the grasp of his hind legs, and a single thread proceeding from his mouth. This is the caterpillar of a very common yellow moth, with reddish markings, called the Brimstone,¹ and belongs to a family known to collectors as *Geometers*, *Measurers*, *Loopers*, and *Surveyors*.

In the month of May, or beginning of June, we may often, by careful looking for, find a branch of elder supporting its very image in a caterpillar,² which is perhaps the most remarkable of the above singular family—a withered-looking, stick-like creature, knobbed and ringed and coloured, and even cracked after the exact pattern of the browner stalks of its native tree. This most perfect simulator, like others of his simulating relatives, aids the deception of his figure by his branch-like attitudes and branch-like quietude (often maintained from morning till night), at which latter period he mostly prefers to exercise both his jaws and locomotive powers. After the usual changes, this curious caterpillar becomes, about July, a pale sulphur-coloured moth, remarkable for the elegant cut of its angular pinions, of which the hinder pair, being prolonged into acute tails, have given it the name of "*Swallow Tail*."³

So much for walking-branches of British growth; neither, as aforesaid, is a walking-leaf a wonder to be seen alive only in foreign parts. We must wait, perhaps, till the arrival of July; but then, if with eyes prepared, we look amongst the foliage of a mingled hedge, we are likely to detect, on a bramble, a hawthorn, or a blackthorn, or may be on a willow, a leaf endued with life more than vegetative, albeit of *feuille morte*

¹ *Rumia crataegata*.

² *Vignette*.

³ *Ourapterix sambucaria*.

hue, and wearing little of motive semblance. We have said a leaf; but we should rather, perhaps, direct the unpractised eye to seek what more resembles a leafy group or cluster;¹ an object for which, on a transitory glance, the four large wings of the Lappet Moth² are very likely to be mistaken. These are of shaded brown, glossed with violet, stiff, strongly-ribbed, and deeply scalloped, and when the insect is in repose (its usual state in the day-time) they are so disposed by projection of the hinder pair beyond the foremost, as to deviate from the usual moth-like contour, and thus approach more nearly to that of congregated leaves.

The seeming vagaries of Dame Nature in thus, as it were, dressing up some few among her children in masquerade attire, have led to a deal of curious inquiry into the "why and because" of such unusual proceeding. Besides such copies as those above noted, wherein the animal is made to put on the vegetable form, there are noticeable among insects a number of remarkable similarities in colouring with the leaves, or flowers, or bark of the plants and trees they feed on, or frequent; and, what is yet more curious, with the dead and artificially-wrought substances, such as stone walls and wooden palings, on which they are most frequently seen resting. Of the kind of imitation last mentioned we have noticed several instances in the colouring of moths found commonly on oak palings. We have one in our possession wherein not only does the painting of the wings resemble the broad surface of the wood, copied as accurately as by the most skilful grainer; but even the transverse cutting at the pale's end would seem to have served as a pattern for the striated covering of the insect's shoulders.

Our subject was commenced by a notice of a few remarkable objects in the insect world, which bear a particular resemblance to others in the vegetable kingdom. Let us now point out, as

¹ Vignette.

² *Gastropacha quercifolia*.

equally worthy of notice, though less likely to excite it, a few resemblances of a more general kind between these two departments of the reign of nature. In external form, hues, and clothing, there is quite sufficient of general likeness betwixt plants and insects to stamp them as productions of the same designing mind and matchless skill. In clothing, wool, hair, spines, and scales are common to both. Flowers alone emulate the colours of the more splendid butterflies and beetles. The delicate veined leaflet or petal are prevailing similitudes of form drawn yet closer in the papilionaceous tribe; the purple pea-flower and the yellow broom telling us, in poetic personality,

“The butterfly all green and gold
To me hath often flown,
Here in my blossoms to behold
Wings lovely as his own.”—*Wordsworth*.

As well as ephemeral flowers there are ephemeral insects. The gauzy wings of the May-fly, like the delicate petals of the cistus, strew the ground in a few brief hours after their expansion; and the Favonia,¹ which displays its crimson glories in the beams of morning (as is the case often with the ephemeral insect) is, like it, dead by noon-day. There are certain flowers, such as the goat's beard, &c, which are known to time their opening at certain hours of the day; and so, in like manner, various moths have been observed to emerge from their chrysalis-covering with equal regularity.

Again, the daisy, the pimpernel, and many other flowers, show the nicest sensibility to atmospheric changes, by always shutting up their petals at the approach of bad weather; and the bee, the butterfly, and other insects, with an instinctive prescience of coming showers, hide within the flower-cups, or close their wings, fearfully resting from their labours or their pleasures.

Numerous also are the properties and productions common

¹ *Tigridia favonia*.

to plants and insects, with a few of which we must close our very imperfect enumeration of resembling points between them. In fragrance, even the rose is emulated by a pretty green beetle¹ not uncommonly found near willow-trees, around which it perfumes the air. *Per contra*—and opposed to all “the sweets of Arabia”—there are the cockroach—the churchyard beetle—the fœtid centipede, and other lurkers in damp dark places, both above ground and below, which resemble in ill odour, as they do in gloomy localities, the hellebores, the hemlocks, and the mandrakes of the vegetable world. And as a few among the flowers of the sun are not a whit behind their darker fellows in this one repulsive quality, so among insects, to say nothing of the pretty lady-bird, there is the green, golden-eyed, lace-winged fly,² that exhales an odour which, even *pour l’amour de ses beaux yeux*, and for the elegance of its form, one can scarcely pardon, any more than for its splendour, one can cordially admire that pride of the hot-house, the most beautiful but most fœtid of the *Stapelios*, named, by the Dutch inhabitants of the Cape, the *Arabische Rose*.

The power of emitting light is another property, common, in some peculiar instances, both to plants and insects, the fire-fly—the glow-worm—and the electric centipede, each having its vegetable representative in the luminous *Fraxinella*, the *Euphorbia phosphorea*, and various plants and fungi in a state of decay.

For almost every vegetable production there is an analogous insect secretion. To say nothing of honey and bees’ wax, which may be viewed rather as vegetable products animalized, there is the white insect wax of China produced by the *Cicada limbata*, made into candles, and paralleled both in quality and use by the tallow-tree,—a native of the same empire. For vegetable gums, we have the insect gum-lac; for vegetable dyes, the insect cochineal, galls, and chermes.

¹ *Cerambyx moschatus* (musk beetle).

² *Chrysopa perla*.

If, leaving the vegetable world, we were to mount upwards in the scale of animated being, we should find amongst fish, reptiles, birds, and quadrupeds, a variety of similar instances, wherein, by resemblance or analogy, by dependence, or as mutually representative, these all stand connected with objects in the insect kingdom. We may, from time to time, notice some of these relations incidentally; but to pass over, now, the intermediate orders of creation, let us see whether lordly man, as well as the lowly plant, has not his analogies, at least symbolic, with the insect he despises.

The mind of man, as it exists in infancy, has been aptly likened to the seed of a plant—considered as possessing, in miniature, the trunk, branches, leaves, and fruit of the future tree; and, agreeably to such a notion, it has been observed that the highest degree of cultivation, of which it is capable, consists in the perfect development of that peculiar organization which as really exists in infancy as in mature years.

Having noted already the analogy of insect development, from the egg up to the winged estate, with that of a vegetable, from the seed up to the flower and fruit—it scarcely needs, the above admitted, to remark that the human mind finds its natural parallel (only one yet more striking) in the insect as well as in the vegetable world.

In the shapes also of good or evil, which the expanding mind assumes, we shall still find, in insect forms and their marked characteristics, similitudes—if not more apt, at least more easily observed, than those presented by larger tribes. In proportion as, diverging by perversity of free will from our divine type and pattern, we resemble or make ourselves the moral counterparts of the tiger, the fox, the hawk, the serpent, we are of course as justly symbolized by those insects which have been observed to concentrate in their pigmy forms the very *essence* of the same instinctive dispositions, such as the cruel Mantis, the fierce predatory beetles, the wily ant-lion, the treacherous and cruel spider.

The same applies to those among us of gentler frame, the lambs and doves amidst the wolves and hawks of human society, which are in like manner aptly symbolized by insect tribes of gentle habits (especially the horned and vegetable-feeding beetles), which have been considered to represent the grazing quadrupeds.

Others of our qualities—our industry, our prudence, our fickleness, our temerity—are exhibited also in the tiny individualities and miniature institutions of insects and insect societies, none of the larger animals, solitary or gregarious, reflecting us in these respects so faithfully as the bee, the ant, the butterfly, and self-destructive moth.



Queen creatures 'neath grass nor grasshoppers.



The Moths in this group are of those not figured in the frontispiece. That in the foreground, beneath the white convolvulus, is the common "Tiger" (*Arctia caja*); the smaller insect above, is the Humming-Bird Sphynx (*Macroglossa stellatarum*), uncoiling its tongue for insertion into the flower. The large one to the left, the Lime-Hawk (*Smerinthus Tiliae*). Above, in upward flight, is the elegant "White Plume" (*Pterophorus pentadactylus*); next, beneath it, is the little "Clearwing" (*Aegeria tipuliformis*); and, below this, a "Vapourer" (*Orgyia antiqua*), of which the nearly wingless female occupies, still lower, a branch of hawthorn supporting also the cocoon, which she employs as a bed for the reception of her eggs.

MOTHS AS IDLERS.



MOTHS have been arranged under two general divisions: *crepuscular*, or those that are seen on wing at twilight; and *nocturnal*, or night-fliers; the latter comprising by far the largest number. The twilight family consists chiefly of *hawk-moths* or *sphinxes*; the former appellation being

founded on the moth's hovering mode of flight,—the latter, on the caterpillar's remarkable form and position when at rest.

When the gaudy butterfly has folded her wings for sleep, and while the dark night-flying moth is still lurking under leafy covert, various sphinxes may be seen darting rapidly from flower to flower, or busied in rifling their sweets as they hang suspended over their honeyed cups. These insect tipplers imbibe their deep potations by unrolling their usually coiled tongues, which are hollow tubes, often of prodigious length, and plunging them to the bottom of the nectaries they drain.

Many of the hawk-moths are named after the trees and plants which furnish the favourite food of their caterpillar life; and from among these we shall select, as greatly distinguished for size and beauty, the "*Convolvulus*"¹ and the "*Privet*." The former, called also the "*Bind-weed*" and the "*Unicorn*" hawk-moth, is a splendid specimen of its kind, if the term "*splendid*"—so often ridiculously misapplied—may be aptly employed with reference to its wide expanse of wing (reaching often to an extension of four inches and a-half), and to the exquisitely varied yet sober pencilling, black on a ground of ashy grey, wherewith these ample pinions are elaborately adorned.

Of a different genus,² and of size very much inferior to the two last, but more interesting, perhaps, than either in its habits and associations, is the hawk-moth called the "*Humming-bird*."³ This name is derived from the vibratory sound emitted by the wings of this pretty insect, as it hangs suspended, morning and evening, above the flowers, of which the honeyed treasures, however deeply hidden, are never inaccessible to its prying tongue. Not even the long, narrow flagons of *Marvel of Peru*, or trumpet honeysuckle, can protect their

¹ *Sphinx convolvuli*.

² *Macroglossa*.

³ *Macroglossa stellatarum*. (Vignette.)

delicious nectar from the long, pliant trunk of the *humming-bird* hawk.

A word now for the hawk-moth "Death's head,"¹ to whom, perhaps, we ought to have given precedence over all the above, on account of his yet superior size and the dark celebrity of his name; but though called a "hawk," and long classed with the sphinxes, he is not considered now as belonging strictly to that family, from which he is distinguished by the very inferior length of his trunk, and also of his antennæ.

The caterpillars of hawk-moths are, for the most part, very distinguished animals of their kind. They are generally large, with skins smooth or curiously shagreened; most frequently coloured green, and adorned on each side by oblique stripes of yellow, blue, or crimson. They may be further and easily discriminated from the "vulgar crew," by a stiff-pointed horn rising from near the tail; also by the remarkable elevation (when at rest) of the head and shoulders, while the hinder legs attach them firmly to a supporting branch. From this peculiar position, they have derived the Linnæan name of *Sphinx*—after the fabled monster of antiquity. Now for a few more of the distinctive features which belong, in their first estate, to the "Hawks," above noticed, namely, the "Convulvulus," "Privet," "Humming-bird," "Death's head," "Lime," "Poplar," and "Eyed."

But we must no longer creep with the hawk caterpillars, or even hover, at morn or eve, with the "hawks" themselves, over the dewy flowers, for we have yet to accompany, in their gloomier flights, a select few from the nocturnal *Phalaenæ* which compose the main body of moths proper, or second grand division of *Lepidopterous* insects. Among these, the night-fliers (holding a reverse proportion to those amongst the feathered race) far exceed in number, not only the evening

¹ *Acherontia atropos*.

flitters of their own division, but also the "painted populace" which sip honey in open day.

Now for our select few amongst the numerous night-fliers. But how to choose out of such a phalanx? That is the question; and suppose—taking a cursory review of it, with reference to *size*, *colour*, and *form*—we note a few individuals among the most distinguished for either attribute.

For *size*, we may give priority to the Great Goat Moth, of whose bulky body and dusky wings, of from three to four inches of expansion, we are not unlikely to catch a glimpse by the light of this August moon. This is the great Cossus, of whose proceedings as a carpenter caterpillar we have already given some description.

"And no great loss either, this dingy insect owl, to the world of grace and beauty!" might some, perhaps, be ready to exclaim, on seeing a specimen of the Great Goat Moth. But differing, with all courtesy, from the taste which can discern no beauty save in varied colours, we must be allowed to express, for ourselves, no little admiration of the sober painting—the silvery or ashy grey, clouded with brown and striated with black—which, not unlike the plumage of some veritable owls, adorns the plain-cut pinions of this "owlish" moth.

In accordance with that beautiful harmony prevalent throughout the works of Nature, the general colouring of moths, both of evening and night, is of that subdued tone which, like night-blowing flowers—the "*Flores tristes colore et odore*"—seems to correspond best with the hours of their appearance. This usual absence of brilliant tints is, as we have already exemplified, amply atoned for by the soft, richly-blended shading, and exquisitely pencilled variety of pattern, which render the wings of moths perfect *bijoux* of natural mosaic; but there are not wanting among them scattered specimens painted in another style—in bright and glowing colours, laid on in broad effective masses. Of this we have a ready example in one of the commonest, yet withal hand-

somest of our night-fliers, yclept "the Tiger;" the rich emblazonment of whose ample pinions has been likened by no mean poet to that of an ancient window:—

"All diamonded with panes of quaint device,
Innumerable of stains, and splendid dyes,
As are the Tiger Moth's deep damask wings."¹

The prevailing hues of this beautiful genus are black, crimson, and yellow, or cream-colour, disposed elegantly in spots and bars. The most common of several species is the "Great Tiger,"² found in all parts of Britain from June to August. Its foremost wings are of rich dark brown, varied by zigzag bars of cream colour; the hinder, of brilliant scarlet with black spots, surrounded mostly by a yellow circle, the body being also scarlet barred with black.

The Tiger caterpillar, seen more frequently even than the moth, and sometimes in winter as well as summer, has a black velvety skin, covered with long brown-tipped hairs, proceeding from white tubercles. It is a feeder on dandelion, lettuce, and other salad plants, and, from its habit, when touched, of rolling round (an innocent measure of self-defence), has acquired the misnomer of Devil's Ring.³

Having said as much of our night-fliers, with reference to peculiarities of *size* and *colour*, as our proscribed limits will permit, we shall now notice a few of them distinguished especially with regard to *form*. Amongst the latter is the moth called the Oak Lappet,⁴ already made known to our readers as a "*Walking Leaf*"—the only specimen of British growth; and the very image of a "*feuille morte*," or, more properly, of several dead leaves together, does it present, in its large wings of rusty brown, deeply indented, and projecting, the hindmost beyond the foremost pair.⁵

In the majority of moths the hinder wings are rounded; but

¹ Keats.

² *Arctia caja*.

³ Vignette to "Life in Death."

⁴ *Gastropacha quercifolia*.

⁵ Vignette to "Resemblance and Relation."

in the "Swallow-tail" we meet with a remarkable deviation from this usual form—the hindmost pinions being prolonged, as well as the foremost, into an acute tail.

Commencing its nocturnal rambles before the usual conclusion of our evening walks, the delicate sulphur-coloured pinions of this pretty insect often flit past us in the June and July twilights; when, in accordance with a comparison already suggested, we might fancy it an evening primrose on the wing.

The wing of the moth, as of the butterfly, generally owes its beauty to the rich mosaic of minute scales or feathers by which it is overlaid, entirely, as it would seem, by way of ornament; for the creature can use its pinions when reduced to transparent membranes, as well as other insects, or a few of its own tribe in which they are naturally clear. Its progress through the air is no more impeded by the rough handling of wantonness or weather, than the flight of true genius by the rough rubs of fortune, however they may strip its soaring energies of the variegated trappings of worldly splendour.

There exists, however, a singular and beautiful family of moths, called the "Plumed," to which the above remark is by no means applicable—the wing feathers of this tribe being as essential to flight, and serving as much to form its organ, as those in the pinions of the feathered race.

Who has not noticed, in gardens and by hedge-rows, floating towards evening in the summer air, an object resembling a large tuft of down, or a snow-flake dropped (a marvel!) from a summer cloud? When followed to its place of settlement (usually some plant or lowly shrub), this questionable wanderer will prove one of the moths just mentioned,—that, probably, designated the "Large White Plume;"¹ a little creature (large only by comparison) with wings consisting each of a single

¹ *Pterophorus pentadactylus*.

row of long quilled feathers of spotless white and silken gloss, the delicate body and slender legs being of the same unsullied hue, contrasted only by large black eyes. This fairy moth, than which few more elegant and graceful flit beneath the moon, comes of a greenish white, dusky-spotted caterpillar, common on the nettles of every hedge; and the "White Plume" has a cousin, less fair and less in size, but not less beautiful than herself, yclept the "Twenty Plume,"¹ from the number of separate feathers of which her variegated brown pinions are composed.

Though of course less conspicuous than the former, the latter is even more easily and frequently to be met with; for, as if inviting the admiration she so well deserves, this beautiful little flutterer often enters our dwellings, and spreads her feather fans for our inspection as she dances in the window—a place of shelter to which she often resorts from the bleak winds of March, or the early frosts of late October; for our little "Twenty Plume," fragile as she looks, is no mere bird of summer.

Having made allusion to certain moths wherein are altogether wanting those merely ornamental appendages, the coloured scales or feathers which usually clothe the wings of their tribe, we must say a little more about them; though that little will here be somewhat out of place, inasmuch as the few "clear-winged" belong more nearly, by habits and other affinities, to the Hawk and Twilight Moths first discoursed of, than to the nocturnal division from which our subjects have been subsequently drawn.

Towards the end of May there may be seen, sipping honey on the wing, (chiefly, however, in the woods and gardens of Surrey, Kent, and Essex), an insect with a short robust, yellowish-olive body, not very dissimilar to that of a drone bee, except that it is distinguished by some terminating rings of

¹ *Alucita hexadactyla*.

deep red, finished at the extremity by a black and yellow tuft. From its clear, transparent, brown-bordered wings, none but the "initiate" would take it for other than a curious sort of fly or bee, whereas it is in fact the "Bee Hawk-moth,"¹ one of those above alluded to. Of another family,² but resembling the last in naked transparency of pinion, there is the "*Bee Clear-wing*," which, in the heat of noonday, is accustomed to flit rapidly from flower to flower, alighting on their corollas to extract their sweets.

From moths with wings painted in mosaic, wings of feathers, and wings naked, we come lastly to moths without any wings at all.

There is a certain moth, classed among the nocturnal, but often to be seen abroad in August sunshine—an active, restless, prying little fellow, who can boast, besides a single pair of horns or antennæ magnificently feathered, a double pair of bright brown wings, the foremost dotted each with a spot of white, and of as ample dimensions as any reasonable little moth need desire. This gay, sunshiny "nocturnal" is called the "*Vapourer*;"³ but, if we may be allowed a pun upon his name, it is his lady to whom the malady of vapours might seem the most likely to be incidental, seeing that while her mate is taking his winged pleasure abroad, she (poor soul!) is compelled to sit at home, or just creep about its precincts, because she has not a single wing to fly with. In truth, a strange, homely-looking creature for a moth is this Lady Vapourer, with her great heavy brown body, making her seem *all* body and nothing else; for not only wings, but even head, horns, legs—each of which are of the smallest possible dimensions—seem sacrificed to the formation of that bulky corporation—a perfect sackful of eggs, which are actually discernible through the skin.⁴

¹ *Sesia fusiformis*

² That of *Ægeridæ*.

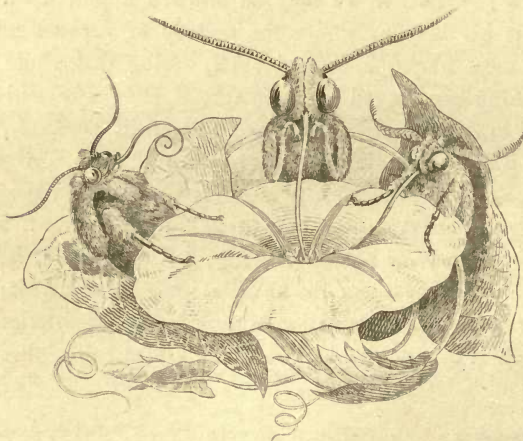
³ *Orgyia antiqua*.

⁴ See vignette for figures of the "Vapourer," male and female.

With regard to one habit, that of feeding, our *fainéant* flutterers widely differ. We have given a notion of the luxurious labours, in this way, of the honey-sipping "hawks" and sphinxes: and we have seen a T moth suck sugar for two hours on a stretch, dissolving it from the lump by a liquid let down through the tubular pipe wherewith he drew it up in syrup. Réaumur speaks of others which regaled on sweets from off his finger, "*comme aurait pu faire un oiseau privé.*"

To many, on the contrary, of the moth fraternity, eating would seem a thing not only undesired, but absolutely forbidden, by the absence of any perceptible organ wherewith to eat. It is thus, amongst others, with the "Great Goat," the "Emperor," and the moth of the silk-worm, which latter, besides having no tongue to use, seldom takes the trouble to employ his wings.

Thus is the most noted and useful of all "Moth Operatives," of all "Moth Idlers," one of the most pre-eminently lazy.



"Luxurious feeders amongst lazy flutterers."



The insects in this vignette are of the allied families *Achetidae*, *Gryllidae*, and *Locustidae*. On the bank, beside its nest-hole, is a Field Cricket (*Acheta campestris*). On the clover-leaves opposite sits a female grasshopper (*Gryllus*), with her sword-shaped ovipositor. Ascending the grass above is one of the small green *Locustidae*, common in damp meadows; and flying upwards in the centre is the *Acridium* (or *Locusta*) *subulatum*, a species with very small elytra, figured in Curtis's "British Entomology."

LOVERS OF PLEASURE.



DIFFERENT nations would seem to have as opposite ideas about happiness as about beauty. The Japanese, for instance, have selected that half-dead liver of centuries, the tortoise, to figure *their* idea of perfect enjoyment, while a Grecian poet chose the grasshopper, so eminently a creature of life, living through every hour of its single summer, as a

representative of surpassing bliss, deserving the apostrophe of

“Happy insect! what can be
In happiness compared to thee?”

But know you not, says the entomologist, that these lines of Anacreon have been only by error and mistranslation assigned to the English grasshopper, at cost of the Grecian tree-hopper, to whom they properly belong? True; but if we examine, somewhat *entomologically*, the well-known ode commencing with the above couplet, we shall perhaps find that each of the attributes, real or figurative, which it assigns to the classic songster of the tree, suit as well, and some of them much better, our rustic songster of the grass.

This felicity, without pretending to decide on its comparative or positive amount, we may fairly suppose to be tolerably equal with the hoppers of the tree and of the grass.

“Fed with nourishment divine,
The dewy morning’s gentle wine,
Nature waits upon thee still,
And thy verdant cup does fill;
’Tis filled wherever thou dost tread,
Nature’s self thy Ganymede!”

This may be said no less truly than prettily of both our summer minstrels, only with reservation. Both, doubtless, take a similar delight in quaffing the “morning’s gentle wine,” the one, from the emerald salver of a leaf, the other, from the golden chalice of a buttercup; but, as vegetable feeders, both of no mean appetite, this “nourishment divine” would, by itself, serve them only poorly. And as for the tree-hopper, one of the uses of the gimlet-like tool with which it is provided is said to be that of tapping trees, after the manner of housewives tapping birches for their sappy wine.

Be it noticed, however, by the way, that neither foreigner nor native are vocal, but, in reality—*instrumental* performers. Thus considered, the grasshopper is as a shepherd with his Pandean reeds, or pipe and tabor, and the tree-hopper, by all

accounts, as a deafening bagpiper—his shrilly clamour audible, it is said, at a mile's distance.

As for being "happier than the happiest king," the poet might have chosen, we imagine, a happier expression to express the supreme felicity of his monarch of the trees,—supposing, that is, the amount of happiness comprised within the golden circlet of a crown to be no bigger than philosophers, and poets also, have usually considered it.

In the undisputed range of their several territories, whether of foliage or of grass, our two appropriators may be reckoned much upon a par; though he of the tree can certainly, from his loftier position, boast of a wider and more absolute command. For this reason (considering both as kings) King Tree-hopper may be also, if not the happier, the safer of the two.

As for the labours of man being made subservient to the insect's use, this certainly is a distinction which belongs much more properly to the grasshopper, "the landlord," if you will, of our meadows and our corn-fields, until at midsummer, or in harvest (his position reversed) he finds himself a *tenant*, forcibly ejected at the point of scythe or sickle. Here let us stop and compare, as applied to both our revellers of the summer, the dictum of poet and the evidence of naturalist.

First for judgment on the tree-hopper. The insect of Anacreon might and may possibly be of more innoxious character; but we are told by Stoll, that the common species of *Tettix* or *Cicada*, what he calls "*La Cigale Vieilleuse*," does infinite injury to trees, especially to plantations of coffee,¹ by boring grooves and holes in the smaller branches, both for the deposition of eggs and for extracting juices.

Now, Mr. Grasshopper! Are *thy* "joy" and "luxury" the joy and luxury of perfect innocence. On ocular evidence dost thou stand condemned. Each notch in the verdant, much more the withering blade, is as a mouth opened against thee in mute accusation. True, we hear and read but little of thy

¹ At Surinam.

misdeemeanours, while those of "the fly,"¹ and "the wire-worm,"² and "the grub,"³ are trumpeted loudly forth, and figure infamously in the "Newgate Calendar" of the indignant farmer. Yet do we suspect, that where thou and thy merry companions most abound, even in the meads of England, the mouthfuls of the cow must lack moisture, and the crops of hay lack weight; and when we read of thy continental fellows caught in hand-nets by the bushel, what must we think of the amount of mischief committed, or likely to have been wrought, by the combination of their jaws! But, however deep the damage they effected, direful was the penalty they had to pay;—when boiled, and their green coats reddened, like those of lobsters or of shrimps, they were served up, a *friand repas*, a dainty dish, to porkers.

The poet to the tree-hopper thus concludes:—

"To thee of all things upon earth,
Life is no longer than thy mirth;
Happy insect! happy, thou
Dost neither age nor winter know;
But when thou'st drunk and danced and sung
Thy fill, the summer leaves among,
Sated with thy summer feast,
Thou retir'st to endless rest."

This will do alike for the tree and the grass-hopper, since, with both, a short life and a merry one is the allotted condition of being, extended only, we believe, to a few weeks of summer or early autumn. Neither they, their leaves, nor grass, nor "flowers," are much exposed, therefore, to those "frosty fingers" deprecated for the gryllus by the Cavalier Lovelace (writer of our prefatory lines), who, with true cavalier philosophy (only a variation on the Greek Epicurean), thus concludes *his* address to the English grasshopper:—

"Poor verdant fool! and now green ice; thy joys,
Large and as lasting as thy perch of grass,

¹ Aphides of the hop, so called.

² Larva of the Click Beetle.

³ Larva of the Cockchafer.

Bid us lay in 'gainst winter rain, and poise
Their floods with an o'erflowing glass."

Anacreon's hopper of the tree, and our British hopper of the grass may now surely be allowed to share between them the former's celebrated ode, and the palm of happiness and song.

Our sketch comparative may possibly have excited in some of our readers a desire to compare for themselves the persons and the merits of our insect professors of the "*joyeuse science*;" but this, with the tree-hopper, is no easy matter. The *Tettix* of ancient Greece, and *Cicada* of ancient and modern Italy, has a place indeed amongst British insects, but it has been rarely seen in England, and only, we believe, in the New Forest, whose shades, however, would not seem to have resounded with its song. Allied insects there nevertheless are, of English birth,—some of them pretty, some of form remarkable, but none very likely to attract attention, for lack of size and song. There is, however, one species to be seen universally on hedges and in gardens all through the summer, which, in shape and make, will help to give a notion of the true Cicada. Though the person of this diminutive tree-hopper, at least before it attains maturity, is screened in a singular manner from common observation, there is scarcely an insect of more easy discovery, when once we have penetrated the mystery of its white veil. Who has not noticed, about the time of the cuckoo's welcome advent, the leaves of hawthorn, hazel, woodbine—the leaves, in short, of almost every common shrub and plant in hedge and garden—beginning to be besprinkled with frothy masses, which they know, probably, by the familiar appellation of "cuckoo-spit?" Let them examine for themselves, and they will find, imbedded in the centre of each frothy "*flocon*," a little green, black-eyed insect,¹ from whose body the froth is none other than a secretion, intended, it would seem, to cover and protect its wingless infancy. If

¹ *Tettigonia*, or *Cicada spumaria*, Cuckoo-spit Frog-hopper.

removed by violence, this frothy veil is gradually renewed; but as its little wearer approaches maturity it becomes curtailed and thinner. Then is our time, if we wish to acquire from this Tom Thumb of tree-hoppers some slender notion of his comparatively gigantic relative, the Grecian Singer, to pluck him, with leaf and branch, from his native tree, and set him up under a glass for inspection or exhibition. The veil of froth having shrunk to a film, we shall then discern, as each part of the insect emerges from a previous skin, first, a large, flat, frog-shaped head, with eyes set wide apart; then a triangular neck or shoulder-piece, flanked by small protuberances, which might seem apologies for wings; and, lastly, a short annulated body, pointed at the extremity. Six legs, of which the hinder pair, more strong and lengthy than their fellows, bespeak endowments of a leaping character, will complete, to all appearance, the somewhat grotesque figure of our little tree-hopper, or frog-hopper, as he is more generally called. But, though thus unveiled and thus uncased (his skin, perfect even to the legs, left behind him in silvery emptiness, like a shadow of his former self) we shall yet have to wait a little longer before we can behold him altogether a thing complete. He lacks not wings, only his wings want expansion; but, after about ten minutes, occupied in their unfolding from out the little shoulder-knots which yet encase them, will appear, in readiness for flight, two large transparent pinions, defended outwardly by a pair of less delicate texture. When the latter have put on their colours, most often variegated brown and white, behold a final and ample finish to the exterior of our frog-hopper, who, as soon as released from crystal durance, will afford, in agile spring, half-flight, half-leap, an ocular demonstration of the fitness of his name.¹

One of the largest and most conspicuous, both for size and song, of our native grasshoppers, is the "Large Green;"² with

¹ See Vignette to "Insect Minstrelsy."

² *Acrida viridissima*. Vignette to "Insect Minstrelsy."

rather a sharp head, large prominent eyes, ample wings, and slender antennæ as long as the body. This noble of his tribe is not an unfrequent resorter to hedges and marshy places; and, though his green armour may easily escape observation, his loud chirping can hardly fail to attract notice, especially amidst the general silence of the feathered choir, in the songless months of August and September.

The above grandee of grasshoppers, as well as his more insignificant brethren, is in the frequent habit of filling up idle pauses between his music and his meals by a sort of seeming rumination, which many have considered an actual chewing of the cud; whereas it is opined by others, that, instead of ruminating, like Mistress Colly, the *Sieur Gryllus* thinks of nothing but of licking, like Miss Grimalkin, his superb whiskers (otherwise antennæ) and his paws—an operation performed, by the way, with a tongue not at all dissimilar in the shape to the unruly member boasted by ourselves. Whether or not chewers of the cud, grasshoppers are, decidedly, crop-pers of the grass; but we are assured, on good authority, that they now and then are nothing scrupulous in the variation of such Brahminian fare, by taking, as a relish, some innocent little insect of a kind differing from themselves; still worse, that when made fellow-prisoners (hard pressed by hunger or confinement) they have been known to commit the cannibal enormity of devouring one another—an example being given wherein one of the gentler sex (which, by the way, among insects is usually the fiercer) was the doer of the deed. But, worst of all!—horror of horrors!—we have it on excellent evidence, how that a certain great green grasshopper (one of the sort just described) on being bottled up together with his own leg (accidentally detached), did make a hearty meal off that late portion of himself. The reverend naturalist by whom this unnatural act is recorded, performed himself, what in some prejudiced opinions might appear a crowning feat of horror. He followed the example of the *Acridophagi*, and pronounced,

on experience, the large green grasshopper of England to be "an excellent condiment."

The Cricket, like the grasshopper, has long slender antennæ, but is distinguished from the latter by a thick roundish head, instead of one more or less pointed.

The most generally known of the *Achetidæ*, or Cricket family, in England, are those called the "Domestic," the "Field," and the "Mole." We have long ago described briefly the most salient points in the character of the fire-side chirper. His country cousin of the field is, like himself, known much more generally by sound than sight; for, being of a shy, unsocial temper, it is not often that we can get a peep (except by stratagem) at his black, gold-striped, shining jacket, or at the more duskily-coloured and more portly person of his female partner, who wears the pacific sword of a "*sauterelle à sabre*." No sooner are these timid little animals warned by their long antennal ears, directed to all quarters like those of a hare, that footsteps are approaching, than, forthwith ceasing their chirp, they pop down into their holes among the grass, at the mouths of which they usually take up their stations.

After having essayed in vain to dislodge them by the spade from their subterranean citadels, it was found by Mr. White that the insertion of a straw or pliant bit of grass would probe the windings of their caverns, and bring to upper air the poor disquieted inhabitants. In a somewhat similar manner French children are said to fish for field crickets with long line of horsehair, baited with an ant.

Early in March, the field cricket, with wings as yet covered in their cases, and so enveloped till the month of April, opens his cell's mouth, and, sitting at its entrance, sings, or, to speak more correctly, plays through the summer days and nights, on to August, when all trace of him, audible and visible, disappears, with the obliteration even of the entrance to his late abode.

¹ See Vignette.

The field-cricket, like the grasshopper, is accustomed to fill up pauses in his music by licking, ever and anon, his feet and whiskers with his rounded tongue, which, together with his jaws, is of course employed also, at other intervals, upon something of more edible description, in the way of breakfast, dinner, or supper.

The family of *Locustidæ* (locusts), though, as before noticed, often confounded with that of *Gryllidæ* (grasshoppers), are distinguishable from them by the inferior length of their antennæ, which are generally shorter by half than the body; also, by the absence in the female insect of the sword-shaped instrument employed, where given, to inter eggs within the ground.¹

That prince of insect destroyers, the migratory locust, has appeared occasionally in Great Britain and in the environs of Paris, as well as in Southern Europe.

¹ See Vignette.



Thou dost dance and thou dost sing!



On a currant-leaf in the foreground lies a caterpillar of the Magpie Moth (*Abraxas grossulariata*), which has been pierced by a small Ichneumon (*Microgaster glomeratus*), black, with yellow legs, of which a magnified figure appears flying upwards on the left. Its parasitic larvæ, having fed upon the juices of the caterpillar, have deserted its body, and spun around it their ovate silk cocoons. Above these, descending on the right, is the large common Ichneumon (*Pimpla manifestator*); and high in the corner opposite ascends another large species, black and orange, of the genus *Ophion*.

PARASITES.

——— “a plague,
The better fed, the longer kept.”



HERE is a certain destructive tribe of insects which may be seen everywhere; and they may be seen not only now, but at almost every season.

The varied species of insects which compose this tribe differ widely both in magnitude and in strength; but they are, one and all, according to their power, active,

prying, and destructive. They are specious in outward form, but they are for ever watching opportunities to make breaches in the citadel of life, that they may introduce therein, sometimes a single assassin, sometimes a murderous host, which sap its foundations, and bring it, sooner or later, to destruction.

Ichneumon is the name generally applied to the parasitic race of which we have been speaking. There are, however, various insects of parasitic habits which are not properly ichneumons, though the name, as signifying *pryers*, does not ill befit them.

The original ichneumon of antiquity was, as most people are aware, no insect at all, but a little four-footed animal, a pryer after, and devourer of, crocodiles' eggs, on which account it was adorned by the deifying people of Egypt as among their benefactors; and amongst others, we are bound, certainly, to rank its insect namesakes, prying as they do, for our benefit, after caterpillars in the egg as well as in maturity.

But the extensive value of ichneumons, a check upon caterpillar depredation, may be best estimated by their numbers, of which we may form a tolerable notion when we hear of above 1300 species¹ in Europe only, some so minute "that the egg of a butterfly is sufficient for the support of two [individuals] until they reach maturity; others so large that the body of a full-grown caterpillar does not more than suffice for one."²

The ichneumons belong to the same order (that of *Hymenoptera*) as wasps and bees; both, spite of their relationship, among the objects of their treacherous attack.

Of this distant kinship there are outward traces in the four transparent wings, and in the slight wasp-like attachment of ichneumon's breast and abdomen, also in its prevailing colours of black and orange; but the ichneumon, whether

¹ "Naturalist's Library."

² Kirby and Spence, Introduction.

a dwarf or a giant of its family, has a figure of such peculiar cut as to make it easy enough, when acquainted with one, to recognize a hundred of his name. We may know them by their long narrow bodies, so convenient for prying and poking into holes and corners, as well as by their long, flexible, jointed horns, so continually on the vibrate as to have procured for their possessors the appellation of *Muscæ vibrantes*. With these organs¹ (supposed to combine the uses of feelers and of ears) our pryers are to be seen for ever exploring, both by touch and hearing, the places and the living subjects best suited to receive their eggs.

Cuckoo-flies is another appellation by which ichneumons are distinguished, because, like the cuckoo, they are accustomed, lazily, intrusively, dishonestly, and cruelly, to deposit their eggs in stranger nests—sometimes within stranger eggshells—sometimes within the bodies of stranger grubs and caterpillars, either in their infancy or when they have attained their growth. For execution of these her nefarious practices, the female ichneumon is provided with a very conspicuous instrument, tail-like, seeming composed sometimes of one, sometimes of three divergent hairs, but consisting, in fact, of a single ovipositor or borer, with a sheath longitudinally divided and opening like a pair of compasses.

The nicest adaptation marks this curious instrument, which, according to the different species and habits of its possessor, is employed to pierce, sometimes only an exposed egg, sometimes the skin of a grub, caterpillar, or chrysalis, and sometimes through defences strong and deep, coverings of silk, or wood, or clay; and, according to these varied requisitions, it is shorter or longer, thinner or thicker, stiffer or more pliant.

In one large and common ichneumon,² easily known by her black body, red legs, and smoke-coloured wings, spotted at the base, this tail-like appendage reaches into *inches*, some-

¹ Antennæ.

² *Pimpla manifestator*.

times nearly three—a length extreme, as longer than the body, but not *superfluous*, seeing that its office is often to penetrate, and that through a barrier of clay, down to the very bottom of deep nest-holes in walls or sand-banks, those, usually, of the mason wasp, wherein, to the destruction of the hapless nestling, its rightful occupant, it leaves behind the fatal deposit of a parasitic egg.

Let us see now—though no very pleasant thing to look upon or think of—the way in which the ichneumon often goes to work upon a poor devoted devourer of the leaves of cabbage, one of the commonest of all caterpillars, whence spring one of the commonest of all butterflies—the Large White¹ of the garden.

While stuffing its variegated doublet of green, black, and yellow, with vegetable pulp, a small ichneumon, a little four-winged imp, with black body and yellow legs, pounces on its back, flourishes her tremendous egg-inserting weapon, and, seeking therewith the caterpillar's most vulnerable part, plunges it, now here, now there, between its rings, leaving, with every puncture, a "thorn in the flesh," soon to be the living prey of a brood of devourers.

The victim of this infliction bears all with a most astonishing degree of quietude; and, without any outward signs of the visitation which has befallen it, continues to discuss its cabbage with apparently the same relish as before, and utterly unconscious that, while seeming only to feed itself, it is in reality supporting the surreptitious progeny which Mother Ichneumon has so cunningly committed to its most involuntary keeping.

Thus strangely supported, the infant or grub cuckoo-flies attain their growth, and so, to all appearance, does their unfortunate fosterer, the caterpillar. According to instinctive custom, the latter, then deserting its cabbage, betakes

¹ *Pontia Brassicæ.*

itself, perhaps in July or August, to the sheltering coping of a garden wall, or cross-bar of a paling; places where, in the common course of nature, it is accustomed to discard the caterpillar and put on the chrysalis form.

We have happened, perhaps, to see a caterpillar, visited as just described, ascend its wall or paling. In a day or two, perhaps in a few hours, we see it again, still a caterpillar, and alive, but reduced almost to an empty skin, while heaped around it is a mass of little oval cocoons of yellow silk. By some people these might be taken for the caterpillars' eggs; by others, for a specimen of its own spinning; and they might suppose, moreover, that it had worked so hard as well-nigh to work itself to death; but no such thing—the yellow silken cases have been spun by the little brood of parasites.

One most noteworthy circumstance in the above and other parasitic infestations of a similar kind, is the avoidance, by the ichneumon devourers, of every vital part of the caterpillar devoured, whose *living* juices are requisite for their support.

Incipient moths, as well as butterflies, are continually being defrauded of their winged estate through the agency of ichneumon, and sometimes other parasites.

During last August, we had six of the golden chrysalides of the little tortoise-shell butterfly all suspended to a cluster of nettles which we had planted in a flower-pot for the provision of their caterpillars. From two of the number appeared duly, in all their bright array of black and scarlet, blue and gold, the insects to be naturally expected; from the third issued a brood of small ichneumons. Of the fourth, fifth, and sixth, the "gold coats" assumed a questionable blackness, and being hence led to examine how they might be filled, we found, instead of the wrinkled wings and folded members of butterfly occupants, three little brown barrels within each, which we presently recognized for the pupæ of two-winged flies; and from these accordingly came forth nine as ordinary-looking

little animals of that description as were ever set eyes on buzzing in a window,—distinguished, however, by their parasitic origin from the household herd.

Though the gay and beautiful order *Lepidoptera* thus holds a dangerous pre-eminence as an object of parasitic attack, it is not alone the butterfly and moth which are often robbed by the same agency of their last estate and brightest inheritance.

We have seen already how a common ichneumon, with a tail-like ovipositor of prodigious length, is accustomed to assail, in the deep nest-hole of a mason wasp, the infant progeny of an insect of its own order, that of *Hymenoptera*; and we shall briefly notice, now, the invasion of an infant asylum of somewhat similar construction, wherein, however, a parasitic *wasp* is the aggressor, and a solitary carpenter bee the maternal guardian, whose cares are often rendered nugatory by its cunning.

The waspish lady (in this case the aggressor) is, however, we can tell you, Reader, a wasp of no common order; but one which, for beauty and splendour, has never met her match in the waspish world, nor her superior, perhaps, in the whole world of British insects. You must surely have sometimes seen her, a perfect living jewel as she is! with head, breast, and shoulders all thickly set with emeralds, outshone only by the ruby-red and burnished gold which mingle in her fiery tail. You must have seen, and certainly have *noted*, such a notable as this, when alighted, according to her wont, in the hottest summer sunshine, upon posts and railings; but you may not know her by the names either of "*Chrysis*," of "Golden Wasp," or of "Ruby-tail Fly;" or even if you know her names, you may not be acquainted with her business—her business, that is, upon posts and railings. Never suppose that she so often visits these uninviting, flowerless, dry localities, merely to bask in the sultry sunbeams, or challenge them to outshine her golden splendour. No; this

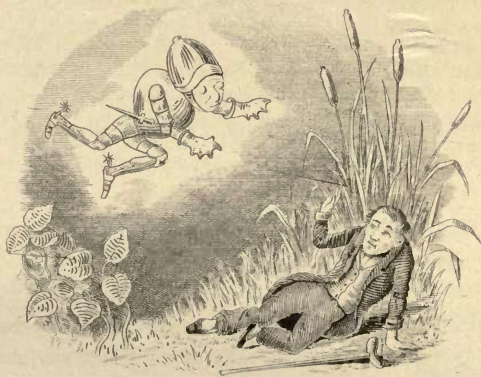
creature, in her glorious array, is bent on glorious mischief. You may, one day, happen to perceive, on the same post as that chosen for her station by the golden wasp, a hole bored in the wood, and you may also possibly see its borer, in the shape of a little bee mother, of the carpenter craft, who, with infinite pains and labour, has chiselled out with her jaws a nursery tunnel, divided into cells, and stored it with provisions for her young. But, ah! that bejewelled ruby-tailed pryer has also watched her in her tender labours, which she will take good care to convert, if possible, to the benefit of her own waspish offspring. No sooner does she issue from her nest-hole, than the wily parasite darts from behind her screen, her dazzling body and glittering wings flash for a moment in the sun, then suddenly are lost in the dark perforation of the tunnelled bee's nest. Woe then to its hapless tenants! They may feast awhile upon the sweets provided by maternal care; but only to be devoured by a grub of the golden wasp, who, in her visit to their nest (fatal as it is brief), has deposited an egg, or eggs, from whence will issue all this murderous mischief.

While the infant bee, deep in its perforated cell, is exposed to dangers such as these, the embryo gall-fly sleeps not a whit more safely within its pulpy or woody globe, pierced, often, to the centre by the egg-inserting instrument of a gall ichneumon. Even the little aphis, or plant-louse, cannot escape, through its minuteness, from the punctures of an ichneumon parasite proportioned to itself; and the aphides' arch enemy, the ladybird, while yet an aphis-eating larva, is preyed upon in turn by a parasitic consumer.

All the parasites above noticed, if not ichneumon, are, be it remembered, flies,—parasite flies,—either four-winged, of the order *Hymenoptera*, or two-winged, of the order *Diptera*. They are all, also, when arrived as perfect insects at their winged estates, live upon vegetable food,—for *themselves*, usually, mere harmless sippers of honey. Only in the parental character are their cruel and parasitic propensities developed, to

be exercised either on living subjects, affording at once a cover for their eggs and nourishment for their young, or else upon those stranger nests wherein is to be found both shelter and a store of living prey suitable for the same purposes.

But there are certain other insect parasites (chiefly wingless, and of the order *Aptera*) which are parasitic entirely for themselves,—perfect insects which infest others, perfect also. Of such are the *Acari*, or mites, with which all, who have ever noticed the commonest of black beetles, must have sometimes seen them covered, as well as their pretty cousins the gold green chafers of the rose. The humble bee is another not unfrequent sufferer from somewhat similar infestation, which is said, moreover, to rob, occasionally, the merry grasshopper of his juices, if not of his enjoyment. These, however, with other parasite tormentors whose visitations extend to bird, and beast, and man, may be looked on more properly as a part of the vermin crew, not now the subject of our notice.



The Phantom Fight suddenly fell.



In the foreground is an Earwig (*Forficula vulgaris*), surrounded by her brood as a hen by her chickens. Above, on the leaf of a rose-bush, is an out-door Spider (a beautiful species, white with crimson markings), keeping guard over her numerous eggs, enveloped in a covering of bluish silk. The leaf behind her has been converted by her industry into a nest, from which, with her eggs, she is supposed to have been dislodged. On the wooden pale opposite is the excavated nest, with enclosed cocoons of a mother "Carpentress," amongst the solitary wasps (*Eumenes*), who is flying up towards it. On one of the leaflets of the rose above it is a Leaf-cutter Bee (*Megachile centuncularis*), employed in excision of one of the circular pieces used in the lining of her nest; and above flies another of the same "Upholsterer" craft.

INSTINCTS OF MATERNITY.

THE POPPY BEE.



THE subject of our opening remarks belongs to one of those solitary, that is to say, not *social*, tribes which, from their ingenious manner of fitting up or furnishing their nests, have acquired the name of "*Upholsterers*," or "*Leafcutters*;" the popular designation of "*Poppy*" being

derived from the material employed for her work by this particular species. It is doubted by Kirby and Spence whether the poppy bee is a native of Britain; but the author of "*Insect Architecture*"¹ is almost certain of having seen the nests of her species in Scotland. We shall give from the latter an interesting description of a tunnelled nursery, formed, and hung, and furnished by one of these little maternal artificers.

"One of these holes is about three inches deep, gradually widening as it descends, till it assumes the form of a small Florence flask. The interior of this excavation is rendered smooth, uniform, and polished, in order to adapt it to the tapestry with which it is intended to be hung, and which is the next step in the process.

"The material used for tapestry by this insect upholsterer is supplied by the flower-leaves of the scarlet field-poppy, from which she successively cuts off small oval pieces, seizes them between her legs, and conveys them to the nest. She begins her work at the bottom, which she overlays with three or four leaves in thickness, and the sides have never less than two. When she finds that the piece she has brought is too large to fit the place intended, she cuts off what is superfluous and carries away the shreds. By cutting the fresh petal of a poppy with a pair of scissors, we may perceive the difficulty of keeping the piece free from wrinkles and shrivelling; but the bee knows how to spread the pieces which she uses as smooth as glass.

"When she has in this manner hung the little chamber round with this splendid scarlet tapestry, of which she is not sparing, but extends it even beyond the entrance, she then fills it with the pollen of flowers mixed with honey, to the height of about half an inch. In this magazine of provisions for her future progeny she lays an egg, and, over it, folds down the tapestry of poppy petals from above. The upper part is then filled in with earth."²

¹ Rennie.

² "*Insect Architecture*."

Another industrious member of the "upholsterer" craft, and one which, as a common native of England, may be more easily observed in carrying on her business, is another little bee called the Rose Leaf-cutter.

From June to August there are often to be found on rose-trees certain leaves out of which have been cut one or more pieces of circular or oval form, and that with as much smoothness and regularity as if with a pair of scissors.¹ These excisions are, in fact, evidences indubitable that the scissor-like jaws of the bee sempstress have been busily at work, and, by watching quietly at hand, it is not unlikely that we may see the industrious little body busy at her cutting out. To follow her as she carries her work home may be more difficult, at least on some occasions,—but not on all, as her chamber and designed nursery may happen to be in a gravel-walk, an old wall, or an old post,—as likely to be close by as far off. Be it where it may, it consists generally of a cylindrical excavated hole, of which the site once discovered, the interior art and mystery may easily be brought to light by help of a spade or other adapted instrument. In truth, though, to disturb thus the labour of love exercised by this little artisan would give us pain hardly to be balanced by gratified wonder at the skill and neatness wherewith she has fitted up her leaf-lined nest.

We mean not to say, indeed, (and what lover of entomology would be credited if he did?) that tenderness would be certain, in our own case, to master curiosity on discovery, for the first time, of a leaf-cutter's abode, or on other the like occasion; but those from whom the maternal upholsterer is likely to meet with more consideration may obtain, without invading her nursery, a very excellent notion of the style of its fitting up. This they may acquire from pages much more accurately descriptive than ours;² but in the meantime we may briefly tell them how that, having excavated or found her hole, (a cavity in ground, or wood, or wall, of from six to ten inches

¹ See Vignette.

² Réaumur; also "Insect Architecture."

deep,) she proceeds to construct within it, of the pieces of leaf she cuts off, several cells, of the shape and about the size of a thimble, which she inserts, successively, the bottom of one into the mouth of that below it. It takes from nine to twelve pieces of leaf to complete each single cell, and as each is finished, she stores it with a rose-coloured conserve made chiefly of pollen, and honey collected from flowers of the thistle. When to this magazine of sweets is superadded the egg from whence its future consumer is to spring, the provident provider of the store covers in the whole with three more pieces of leaf cut in a circle as truly accurate as compasses could describe; room being left above this cover for insertion of a succeeding cell, our "upholsterer" thus proceeds till her nursery tunnel is completely fitted up.

Well might the gardener of Réaumur, on accidentally unearthing such a work of wonder as this nest of the leaf-cutter bee, suppose it, in his ignorance, the work of some magician!

The wool or down of pubescent plants, such as rose campion and cat's-ear, shaven off and "rolled up like a ribbon" for convenient transport, is used by another rather common species of solitary bee,¹ to compose, not the lining or compartments, but the exterior covering of her nest, which is plastered within, and provided, like those before mentioned, with a store of suitable provision.

Bee "carpenters" and bee "masons"—all working with maternal views, and named, like the "upholsterers," from the character of their labours—show no less ingenuity and perseverance in the employment of their more solid materials. The masons construct their nests, some with sand, some with earth and mingled chalk, some with earth and wood, uniting by gluten their grains or fragments.

The carpenters chisel their cells out of posts and palings a little softened by decay; and a nest of this description has been found, when cut open by a curious observer,² to consist of

¹ *Anthidium manicatum*.

² Rennie, "Insect Architecture."

a tunnel excavated in the wood, and divided by thin partitions of clay into five or six compartments, each with its supply of pollen for the single inhabitant who is to emerge from the egg deposited therein.¹

Besides these, there are bee "miners," which, as their name imports, excavate galleries, for their nurseries, in the earth.

These artisans amongst solitary bees have sisters in nearly all their crafts amongst the solitary wasps, many of which latter work no less expertly than the former in their different styles of maternally-designed architecture.² Nor are these waspish mothers a whit behindhand in providing for their nestlings' necessities, only showing their fiercer propensities in the nature of the food provided—which, in place of a heap of pollen, is usually a pile of flies or gnats, and sometimes, as in the case of the wasp "mason," a spiral column of living caterpillars, or a brace or two of live spiders.

On these, the number of which is nicely calculated to meet his wants, the young wasp is nourished up to perfect wasphood, unless, spite of his mother's labours so cunningly protective, he himself fall a prey to the usurping offspring of some ichneumon-fly, who, more clever still, has contrived, cuckoo-like, to lay her egg within the nest he occupies.

One species of mason-wasp, mentioned by Bonnett, approaches nearer than any of the above to the feathered race in her mode of supplying her young, for instead of enclosing at once within her nursery larder a store sufficient to supply the future exigencies of its inmate, she, from time to time, carries thither a living caterpillar, opening and reclosing the nest for her entrance and exit.

The proscriptive skill and care exhibited by solitary bees and wasps in the construction of their nurseries is probably, as with birds in the building of their nests, entirely of an instinctive character; but we must assign, surely, one of a higher description to certain other features of insect maternity, with a few of which we shall conclude our imperfect sketch.

¹ See Vignette.

² See Vignette.

This love of offspring does not seem the most strongly developed in the mild and gentle of the insect tribes,—but in those, especially, of fierce and predatory habits, as the cruel spider, the devouring water-scorpion, the already-noticed murderous wasp, and the, occasionally, cannibal earwig.

It might not so much excite our wonder to find the large feathery wings of the soft and beautiful butterfly, or those of the downy moth, spread, dove-like, over their eggs or infant broods, to hatch or cherish them. These, indeed, are not without their maternal instincts wonderfully displayed. The butterfly deserts her delicate repast among the flowers to deposit her eggs on the (to herself) uninviting cabbage, which is to support her progeny; and the moth, in one or more instances,¹ strips the down from her own body to defend her brood against the winter's cold; but if we want a parallel to the patience, the care, and affection of a brooding hen, we must look for it in the harsh, sharp, linear form of the earwig. De Geer tells us (his observations being confirmed by later naturalists) that she absolutely sits upon her eggs, as if to hatch them, and guards them with the greatest care; if scattered, collects them one by one into a heap, then resumes and assiduously maintains her sitting. When hatched, her nestlings, like those of a hen, creep under her, and are thus sometimes brooded for hours by the mother insect.²

We have had an opportunity of observing for ourselves the brooding care of these insect Partlets, as exemplified in one which we transported from her nest beside a stone, and committed, with half a dozen of her white progeny, to the keeping of an inverted glass. Knowing that, in spite of an occasional *penchant* for a living subject, the usual food of earwigs consists of flowers, we put a blossom of dandelion into our prisoner's coop of crystal—a piece of consideration for which we were amply repaid by seeing Mother Earwig commence, forth-

¹ That of the Gipsy Moth; also the Gold-tail.

² See Vignette.

with, upon one of the yellow petals, which, directly afterwards, was attacked, *at the bitten edge*, by the tender jaws of one of her surrounding brood, thus led, apparently, to the repast which she seemed to have prepared for their more easy discussion.

The egg-bearing water-scorpion displays even more attachment for her eggs than birds, for she never leaves them until hatched, carrying them always in a cluster on her back. The cochineal insects, of which one species affords the well-known dye, protect their eggs by covering them with their own lifeless bodies. Some of these little animals, with their eggs thus curiously guarded, and embedded in a white cottony secretion, are to be found on grape-vines, too commonly for the gardener, especially near London. The hawthorn furnishes, in another coccus, another instance of frequent occurrence, in which the body of the mother insect, dried to a silvery grey skin, is to be seen protecting from winter's cold a multitude of her orange-coloured eggs.

The two habitudes last named bear, certainly, most of the instinctive character, but at all events they are poetic in idea. Perhaps, however, none of the maternal traits above noted are so strongly marked as those wont to be exhibited by a species of spider common under clods of earth, and often seen carrying her eggs in a white silken bag fastened to the end of her body. "No miser," says Kirby, "clings to his treasure with more solicitude than this spider to her bag. She carries it with her everywhere. If you deprive her of it, she makes the most strenuous efforts for its recovery. If you restore it, her actions demonstrate her joy. She seizes it, and with the utmost agility runs off with it to a place of security.

"When the proper time arrives, she makes an opening in the bag for the young to come forth, when they run in clusters on her back and legs; she carries them about with her, and feeds them till able to help themselves."¹

Bonnet's relation concerning an individual of the same

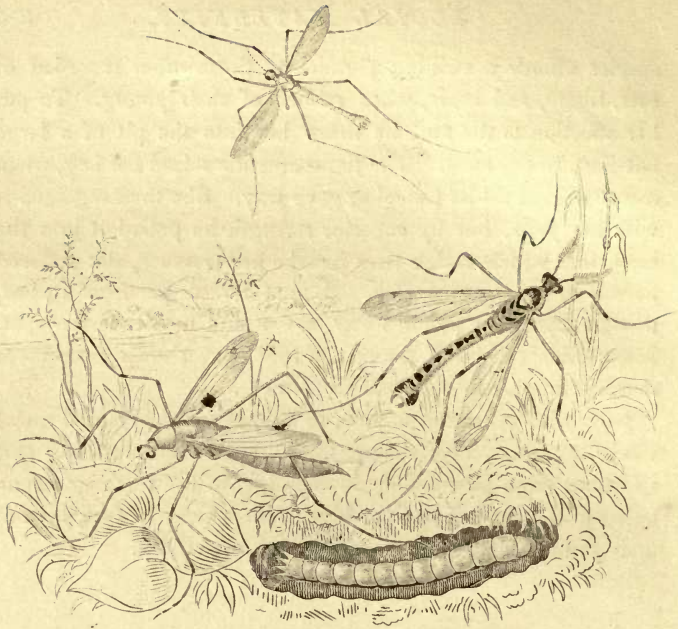
¹ "Introduction to Entomology."

species affords a striking parallel to those often recorded of cats, tigers, and bears, when robbed of their young. To put her affection to the test, he threw her into the pit of a large ant-lion, in the sand. The fierce creature seized her bag, when she struggled till its fastening gave way. She then regained it with her jaws, but by superior strength he pulled it into the sand, into which, rather than forsake her treasure, she suffered herself to be dragged also. Bonnet forced her from it, but, though repeatedly pulled away, she would not leave the spot. Many other species of the spider race have shown themselves scarcely inferior in maternal attachment.

Now with reference to ants, as well as social bees and social wasps, we must here notice, that the maternal instincts and affections reign paramount, through life, in the working population of the ant-hill and the hive, with which, in fact, love of their young forms the very mainspring of activity.



Admire the dexterity of the leaf-cutter Bee.



On the grass, to the left, is one of the common brown Crane-flies *Tipula oleracea*), distinguished as a female by her pointed ovipositor. In flight, above, is a male of the same species, and below, in the earth, another, in its state of grubhood, employed in devouring the grass roots, on which, in its earliest stage, it is accustomed to feed. On the right, above, is a handsome Crane-fly (*Ctenophora*), with black and yellow markings and plumed antennæ.

FATHER LONGLEGS AND HIS FAMILY.

NEXT to the butterfly and the ladybird, we may perhaps assign a place among the insect familiars of our childhood, to that ungainly skipper best known to us, wheresoever we may meet him—"upstairs or downstairs or in my lady's chamber"—as "Old Father Longlegs."

Our book-learning may have possibly made us acquainted with him, since, under the more refined epithet of *Tipula* or Crane-fly; but call the creature by what name we may—

"*Tipula*," "Crane-fly," "Jenny Spinner," "Tailor," or "Daddy Longlegs," it was nothing but his *legs* which made him, in our childhood, an object of wondering notice: and it is at this prodigious length of shank that some grown-up people may be apt to wonder still; to wonder also for what purpose it was given; to wonder, thirdly, why the legs, which seem in truth hardly to belong to their owner, fall off so readily; and to wonder, lastly, at the unimpaired activity which he is accustomed to evince under the loss of one or more of his six unstable supporters.

Now, with reference to wonder the second and inquiry the first, that, namely, about the use to its possessor of an extra length of limb—no very probable solution is likely to present itself while we merely look at Father Longlegs when we happen to encounter him on *stairs* or in *chambers*, which, whether "my lady's" or "my lord's" are places where, in fact, he has no business—where he is nothing but an intruder—a stranger—and where, like other awkward creatures in strange society, he is never to be seen to the best advantage. But let those who would have a shrewd guess at the *use* of his ungainly members, take a peep at Mr. Longshanks when he is at home in his own element and in the indulgence of his own habits; for which purpose they can hardly do better than accompany us, this fine September evening, to some pleasant meadows watered by a running stream.

Here then we are, with the sun about to set in all his glory; and here is our long-legged acquaintance in his glory too, and full of glee amidst a crowd of his companions; now rising blithely on the wing—now footing it featly over the blades of grass, be they low or be they high, by the help of his convenient pins, used like stilts to overtop all impediments, and to prove to us, lookers-on, that stilts were given him for *something*, and for something better than idly to fan the dust of "my lady's chamber," as he waves them up and down in his rest of seeming restlessness upon wall or ceiling. As we look,

now, on the movements of Father Longlegs, we seem to see clearly that long legs were given him because his proper business, exercise, and pleasure require him to make his way not over level ground, but over high, uneven grass.¹

Our stilted walker is now upon the wing, and, as he rises into air, we perceive another of the apparent uses of his lengthy legs. We notice now, that in the act of flying his two fore legs are horizontally pointed forwards, while the four hinder are stretched out in an opposite direction; the one forming the prow, the other the stern, of his trim-built vessel, in its voyage through the ocean of air.¹

We see in this, his manner of aerial progress, an additional fitness of our *Tipula's* name of Crane-fly, and are forced to confess that the crane-fly has reason to glory in the length of his legs; but why he is so remarkably apt to lose them is a thing which remains rather less apparent to our comprehension.

If any of our friends will take the trouble to look narrowly at the next Longlegs, rested conveniently for inspection on wall or window, they will perceive (what perhaps they never saw before) two curious little appendages, like drumsticks, placed behind each wing; for what purpose it may puzzle them to tell. These instruments, which are by no means peculiar to the *Tipula*, but possessed also by the common house and other two-winged flies, are called *poisers*, and, as their name imports, are considered to balance the body and render the flight more steady, serving (as says Derham²) "to the insect, as the long pole laden at the ends with lead does to the rope-dancer." The same naturalist tells us, that "if one of these be cut off the insect flies one side over the other and falleth;" and another, who supposes them air-holders, found that a *Tipula* deprived of both could not fly at all.

Of these same appendages it has also been suggested, that, by their employment as veritable drumsticks beating on the

¹ See Vignette.

² In his "Physico-Theology."

wings, they may assist in the production of that buzzing sound, to account for which has puzzled not a few philosophers. But, however this may be with the two-winged band in general, the little knobbed articles, to which we are now directing special notice, are not thus employed, seeing that it cannot be said of the crane-fly, as of some other fliers, and of that celebrated lady, "with rings on her fingers and bells on her toes," that "the '*longlegs*' makes music wherever he goes."

Those who behold the crane-fly only in its proper person—in the elevated maturity of its stilted supporters—must not suppose it has been always thus exalted above its fellows, nor must they imagine it to have grown by degrees to its present stature. Be it remembered, that perfect insects never grow; and to commence from the beginning the life of a Father Longlegs, we must go back upon a period when he had not a leg to boast of; when he and his skipping comrades, now giving double life, by their gymnastics, to the grass they sport in, were all buried underneath it in the form of legless, wingless grubs,¹ doing their best, by gnawing at its roots, to deprive this very grass of its own quiet measure of vegetable vitality. In fact, these harmless-looking idlers are accustomed, in their state of infancy, to play very serious pranks, though neither by daylight nor by moonlight, under cover of the suffering herbage. Exactly in reverse of the fertilizing influence of fairy footsteps, they turn the green sward brown by invisible workings, quite as withering as were once esteemed the fabled mischiefs of the brownies themselves; and it is not unlikely that to those, or other the like imaginary agents, was often ascribed, in days of yore, the occasional cutting off of hay-crop promises by the trenchant jaws of crane-fly devourers in their grubhood.

But the longlegs himself is harmless? Why, no; inas-

¹ Larvæ of *Tipula*. See Vignette.

much as he, and his long-legged mate, are the parents of these verdure-blighting imps.

If we look at the slender bodies of different *Tipulæ* of the same species, we shall perceive that some of them are truncated, or as if cut off at the end, while others are finished by a sharp, awl-like point.¹ Now this pointed instrument, which always belongs to and betokens a hen among these insect cranes, she employs, under direction of prospective instinct, to bore the ground for deposition within its bosom of her numerous eggs. From these, which have been compared to grains of gunpowder, issue in due season the verdure-blasting trains, which, devouring the roots below, give to the herbage above the appearance of being scorched by fire, or even totally consumed; as in an instance, adduced by Mr. Rennie, of an acre of ground at Blackheath, which he saw in the summer of 1828, "stripped of grass and everything green, as if pared off from the surface" by the full-fed larvæ, then about to assume their second form of pupæ.²

Réaumur, who describes resembling effects from the like insect causes, in Poitou, opined that these destructive little animals are *earth-eaters*, causing injury to roots only by disturbance to the ground. This supposition is admitted by the naturalist before named to have some confirmation in the fact that certain species of *Tipula* feed, as grubs, upon the vegetable mould in hollow trees; but, amidst different opinions, it would seem still a questionable point, whether the lanky limbs of Father Longlegs are to be considered as most of earthy or of rooty derivation.

But upon whatsoever nourished through its first estate, the *Tipula*, when it ceases to be a grub, leaves off grubbing after earthy roots or rooty earth, in the midst of which it however quietly remains; while under the encasing form of *pupa*,³ the long legs, with all accompanying members of the "coming"

¹ See Vignette.

² "Insect Transformations," p. 254.

³ Pupa of *Tipula*.

fly, are brought by degrees to their full measure and perfection. Before, however, this important epoch quite arrives, our Father Longlegs, now a long fellow in a sack, seeming through a load of superincumbent earth to smell the air, contrives, cleverly, to work himself upwards, not merely to the surface of the ground, but to an inch or two above it of upright elevation. Thus supported by surrounding blades and stalks of grass, comes forth, at length, in all his disproportioned, yet appropriate lengthiness of limb, the *Tipula*, alias *Crane-fly*, alias *Tailor*, alias *Jenny Spinner*, alias *Father Longlegs*, whose long history we thus end just where we began it.

Pupa-cases, such as above described, either occupied or vacant, may sometimes be seen in scores amongst the herbage where crane-flies are abundant. The practice of these, in wriggling themselves towards or above the surface, whether of ground or tree, wherein they have been imbedded, is one frequently exemplified in the pupæ, or chrysalides, of various insects, whose delicate wings would otherwise be injured in bursting from their temporary tombs. One amongst thousands, this, of those nice provisions of Providential care, such as cannot but excite our love and admiration.

Besides the common *Tipula*,¹ there are others of nearly resembling size and figure, but much more gaily coloured. One of these² sports, instead of the sober russet-grey of Father Longlegs, an extremely handsome uniform of black and orange-yellow, black-tipped wings, and plumed antennæ of imposing length and beauty. This, with others of the more distinguished few of the Longleg family, is only likely to be met with singly, sporting beside woods and hedgerows, never in troops over grassy meadows; and even their grubs, with birth-places less lowly than the common herd, generally first see the darkness, not in subterranean vaults underground, but in the hollow chambers of decaying trees.

¹ *Tipula oleracia*.

² *Ctenophora ornata*.

There is a certain little fly, with a bright orange-coloured body, rounded and fringed wings, and feathered antennæ, belonging to the Longleg family, but compared with which the "Father" of it is a perfect giant. As with his Robin Hood relative, the rapacious propensities of this Little John are all exercised in early life—the period, namely, of his grubhood—when he "sows his wild oats" by committing excesses on our cultivated crops of wheat. While these are yet in bloom he revels on the pollen florets, and leaves, in the deficient or withered grain, serious tokens of his destructive presence.

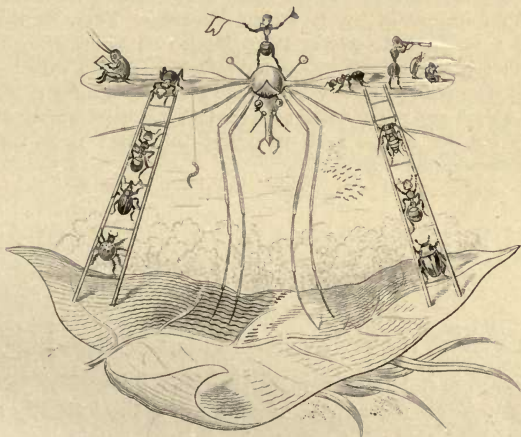
So extensive, in a multiplied form, are the injurious operations of this tiny midge, that he and his companions in mischief have acquired generally notoriety, under the name of the "Wheat-fly."¹

Besides the above, there is a mixed multitude of small *Tipulæ*, or long-legged flies, much resembling, and often confounded with, the gnat; though the common gnat is sufficiently distinguished by the singular transformations of its aquatic larva, described already in "A Life of Buoyancy." In their last and perfect stage, many, however, of these Tipulidan flies or gnats, are full as buoyant as those to which the latter appellation more properly belongs: like them, they are often alert and joyous, while other insects are dead or dormant; like them, fly unwetted in the shower, and often, like them, dancing in the *winter* shade, hold, in defiance of the gloomiest season, their "mid-day sports and revelry."

But it is not with such diminutives that we should conclude handsomely our notice of the line of Longlegs. Let us return instead to the stilted "fathers" or mothers of the tribe, with a random guess at the derivation of one of their incongruous appellations. Why they should be called "Tailors" we cannot tell, unless, as animals made up of legs, they may be considered but as fractions—ninth parts, perhaps, of an insect. Why creatures never known to spin a thread should

¹ *Cecidomyia Triticæ*, Kirby.

sometimes also be named "Jenny Spinners," was, to us, no less a mystery, till, on a summer's day, its possible solution flashed upon us. We were sitting in a shady lane, when, on the turf that bordered it, what should appear but a single *Mother Longlegs*—neither flying nor walking, but whirling and *spinning* round in a strange eccentric manner; her wings and fore-legs beating in the air, her hind ones bent at their angles so as to let the end of her pointed body, which was held bolt upright, come in contact with the ground. Here, then, was our "Jenny Spinner," not thus spinning for amusement—merely to make herself drunken with delight,—but gravely spinning mischief to the grass. With the united points of her sharp shining forceps she was *gimletting* the turf, and in every hole dropping one or more, perhaps, of her grain-like eggs, germs minute of future long-legged spinners.



How vast to an Gmnet its stupendous elevation.



Ascending the tombstone to the right, is the Churchyard Beetle (*Blaps mortisaga*), distinguished by its intense blackness. Next, on the ground below, is a small, black, shining Dung Beetle (one of the *Histeridæ*); and adjacent, a pair of black and orange *Necrophori*, notable for their industry in interment of animal remains. Climbing the grass above, is the *Silpha quadripunctata*, a black and yellow feeder upon carrion; and in descending flight, lessened by distance, is that most common of beetle scavengers, the Dor, or Clock (*Geotrupes stercorarius*).

THE SCARABÆUS AND ITS MODERN WORSHIPPERS.



WHAT a striking contrast is there between the two insects which figure most conspicuously in the annals of antiquity—the butterfly and the dung-beetle! The former was regarded by the ancients as an emblem of the soul, the latter was made by them an object of soul's worship. The one, all beauty, vivacity, and buoyancy; having no

business in life but pleasure—no habitation but among the beautiful flowers, and breathing the perfumed air of summer. The other, in form dark and repulsive, in habits dull and laborious; its abode beneath the earth, or within the loathsome substances which cumber earth's surface, and its favourite atmosphere one of steaming fetidity thence exhaled.

Yet this, the *Scarabæus sacer*, or Sacred Beetle, was the creature which the wise and civilized Egyptians imaged on their sepulchral monuments, enclosed with their embalmed bodies, carved on their lofty columns, inscribed on their astronomical tables, looked on as symbolic of the world, and of the glorious sun,—nay, adored as a visible deity!

This insect was also more especially the symbol of their goddess Neith, whose attribute was supreme power in *governing* the works of creation, and whose glory was considered to be increased rather than diminished by the presence of another power named Phta, the Creator. As typical of Neith, the insect was carved or painted on rings, and worn by soldiers, in token of homage to that Power which disposeth the fate of battles.

The modern representative of the *Scarabæus sacer* (imported from Africa into southern Europe) is the Pill-Beetle, so named from its practice of moulding round pellets of dung, depositing an egg in each, and then, by the assistance of the hind legs and extremity of the body, rolling them backwards into a deep hole, previously excavated for their reception. If one of the insects finds itself inadequate, alone, to the performance of this task, it is accustomed to call in and obtain the assistance of one or more of its fellows. This, certainly, is a habit sufficiently remarkable to attract attention from the least observant, and, as one of Nature's *uncommon* wonders, it formed, in times of superstition, a convenient peg whereon to hang a tissue of embroidered fiction. The Egyptians, accordingly, were wont to regard these insect labours as symbolizing those of Osiris and the Sun; the balls of dung were exalted into

types of the world, and, the beetles being supposed to push them always from east to west, for twenty-eight successive days, their movement was made also to represent that of the habitable globe. To carry out this symbolic scheme, the Scarabæus (reckoning five joints to each of its six feet) was said to have thirty fingers, corresponding with the number of days in each sign of the zodiac; while, to complete the analogy, the six notches or angular projections of the insect's head were likened to the rays of the sun.¹

The Scarabæus was never, that we know of, made in England a recipient exactly of divine honours; yet would it appear that this, or a beetle of similar habits, held no mean place in the estimation of one at least among our ancestors, and in times comparatively recent. Mouffet, one of the fathers of entomology, is loud in praise of its virtues, which (according to him) should serve as a stimulant to every good quality,—should invite to labour, temperance, prudence, justice, modesty, and should teach man contentment, by showing him how a beetle can luxuriate in a bed of dung, just as well as in a bed of roses. How *justice* should have a place in this catalogue of virtues to be learnt from beetle practice, puzzles us, we confess, to discover; nor may it be worth the trouble of inquiry. Perhaps it would better suit our purpose to see whether this once worshipped and lauded Scarabæus has sunk, in these modern times, into utter disregard; or whether amongst those who, perhaps, know him not by name, there may not be found a considerable number who, inasmuch as they follow his ways, may be said still to worship his image.

Where, at all events, shall we find a better emblem, if not a better god, for the busy of the money-making, money-loving world, living immersed in filthy lucre, than the dung-abiding beetle? Like it, are they not for ever toiling, from rise to set of sun, to amass and roll together their corrupt riches? And

¹ Latreille, "Annales du Muséum," 1819. "Des Insectes peintes ou sculptées sur les Monumens de l'Égypte."

for what purpose? Not to diffuse, but to bury them, even as the beetle, in the earth of their sordid selfishness.

Verily, shade of Sir Thomas Gresham, thou princely merchant! save but for respect for thee, and for the remnant of nobler traders which, with the baser sort, are now wont to assemble in the modern halls surmounted by thy ancient grasshopper, we would even tear down that classic, youthful, rural, mirth-loving insect, and set up, in its stead, a gigantic *Scarabæus*, which, stripped of its fabulous, but clothed in all its veracious attributes, would be, of all symbols, most appropriate to surmount a temple of Mammon.

The sacred beetle of Egypt is not a native of Britain, and only of Europe as naturalized in its southern countries from the neighbouring continent of Africa.

But though we have not a *Scarabæus sacer* in the list of our indigenous beetles, we have an insect greatly resembling it in form as well as habits, which may be met with almost everywhere, and on every day from March to October. This is no other than the "great dor," or "clock"—the "shardborne beetle" of our immortal Bard,—that which, on summer and autumn evenings, so often with drowsy hum wheels lumbering past us, or bangs up right against us.

Like the *Scarabæus*, this clock-beetle¹ is, in figure, broad, and short, and clumsy. His forehead has none, indeed, of those sun-like rays,—in plainer language, none of those vandyked notches which distinguish that of the Egyptian, but it is adorned, like the latter, with a pair of horns,² finished by laminated or leafy tips. Black, in both insects, is the prevailing hue, at least on the upper side; but in our dor, the wing-cases are tinted on their margins with bright violet, while the legs and whole of the under surface are cased in armour of steely blue, glossed with green and purple. The exterior, indeed, of this dweller in defilement is far from unpleasing,

¹ See Vignette; Clock Beetle, *Geotrupes stercorarius*.

² Antennæ.

and he is remarkable, as well as others of his tribe, for absence of all unsightly traces of his habits or resorts.

To look at the unsullied polish of his mail, one might suppose him risen, like the green gold-chafer, from a bed of roses; whereas, being a true *Scarabæus* in nature, if not in name, there is little doubt, when we see him in his evening flight, of his having left recently a bed of very opposite description—a bed, in short, of dung—wherein, through the live-long day, he has been reposing; or whereat, like his Egyptian prototype, he has been hard at work, helping, perhaps, his partner to roll masses for enclosure of her eggs, or to bore holes for their reception.

The drone of the dor-beetle was once taken as a prognostic of fine weather, and is esteemed by some people, although a harsh, yet by no means an “undelightful hum.” To us, associate though it be with warm and quiet evenings, there is always a sort of sadness in its sound, perhaps because it reminds us of Gray’s “Elegy,” perhaps because, being most often heard towards autumn, it comes like a requiem of departing summer.

Allied to the above, as belonging to the useful company of insect scavengers, are the “Burying Beetles,”¹ so called from their being accustomed to perform the office of grave-diggers to defunct frogs, birds, moles, “mice, and such small gear,” whose bodies would else cumber the ground more extensively. A common species of this serviceable family of the Coleopterous order is a pretty-looking insect, considerably smaller than the “great dor,” and easily distinguishable from that and other black beetles by two broad scalloped bands of deep orange-colour painted across its black wing-cases, which are a good deal shorter than the body, and have the appearance of being truncated, or abruptly cut across the ends. The thorax, head, and legs are of a deep black, also the body; the

¹ *Necrophorus vespillo*. See Vignette.

latter fringed at the sides and articulations with yellowish hairs; the antennæ knobbed and foliate at the tips.

We must inquire now into the "burying beetle's" motive of incitement to its laborious occupation of interment. It is not certainly the promotion of our sanitary benefit that the creature has in view; neither, we suppose, has respect for the dead or their families much to do with its burial of animal remains. The incentive to the work is not to be found in mere love of labour, nor yet in love of self, but is, in fact, like the mainspring of various other insect actions, of a parental character. Its eggs being first committed to the carcase, the beetle then proceeds to commit that to the earth, in order that, thus protected from predatory birds and foxes, it may afford provision for her young, as soon as, in the shape of larvæ, they come into existence. This most curious practice of instinctive sagacity was first noticed by a foreign naturalist, M. Gleditsch, who, having observed the mysterious disappearance of moles, laid upon the beds in his garden, discovered that beetles were the agents of their inhumation, effected for the purpose above named. To watch their proceedings more narrowly, he put four of these insect grave-diggers into a glass vessel, half filled with earth, on the surface of which were laid two dead frogs. Of these, one was interred in less than twelve hours—the other on the third day. He then introduced a dead linnet, on which the beetles were speedily engaged. They began their operations by pushing out the earth from under the body, so as to form a cavity for its reception: and it was curious to see the efforts which they made, by dragging from below at the feathers of the bird, to pull it into its grave. The male, having driven the female away, continued to work alone for five hours. He lifted up the bird, changed its place, turned and arranged it in its grave, from time to time coming out of the hole, mounting on the carcase, treading it underfoot, and then again retiring below to draw it to a greater depth. At length, wearied apparently with this incessant labour, he came forth.

and laid his head upon the earth beside the bird, without the smallest motion, for a full hour, as if to rest; then again crept under the earth. The next day, in the morning, the bird was an inch and a half below the surface of the ground, and the trench remaining open; the corpse seemed as if laid out upon a bier, surrounded by a rampart of mould. In the evening it had sunk half an inch lower, and in another day the work was completed, and the bird covered. Other dead animals being added, the four beetles, in fifty days, interred no less than twelve bodies in the narrow cemetery allotted for their work.¹

Of a sepulchral character in unison with the above, but of associations much more gloomy as connected with ourselves, is the beetle of the churchyard,² our proposed pattern for a vane on the Exchange.

This dark, ill-favoured, ill-scented, and, in the eye of superstition, ill-omened insect—whose proper name (*Blaps mortisaga*) savours of mortality as strongly as its common, though not popular appellation—is one of those creeping things from which whenever, in its favourite haunt, it happens to cross our path, we turn instinctively away, even as we are wont with other, the like mementos, come they in what shape they may.

The sepulchral locality in which the *Blaps mortisaga* is usually met with, may serve, of itself, to enable those unacquainted with insects to give a pretty shrewd guess as to its character and occupation. It may also be distinguished as one of the *blackest* of all black beetles, its funeral sable being totally unrelieved by those tints of green, and blue, and violet, or even brown, which, in most others of its tribe, serve to enliven their prevailing sombre hue. In form, this haunter of cemeteries is rather long and slender, both the body and the wing-cases, by which it is quite covered, terminating in a

¹ M. Gleditsch, quoted by Kirby and Spence; also in "Insect Architecture."

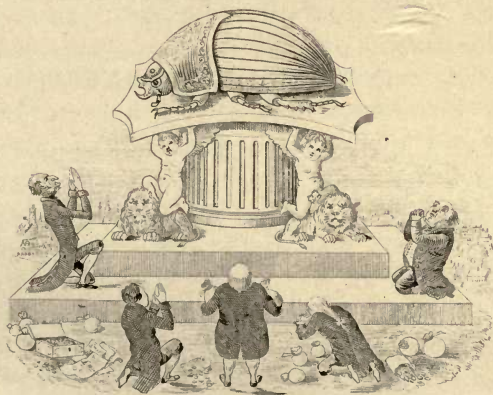
² *Blaps Mortisaga*. See Vignette.

tapered point. The antennæ are jointed in their whole length, but are destitute at their extremities of foliated knobs.

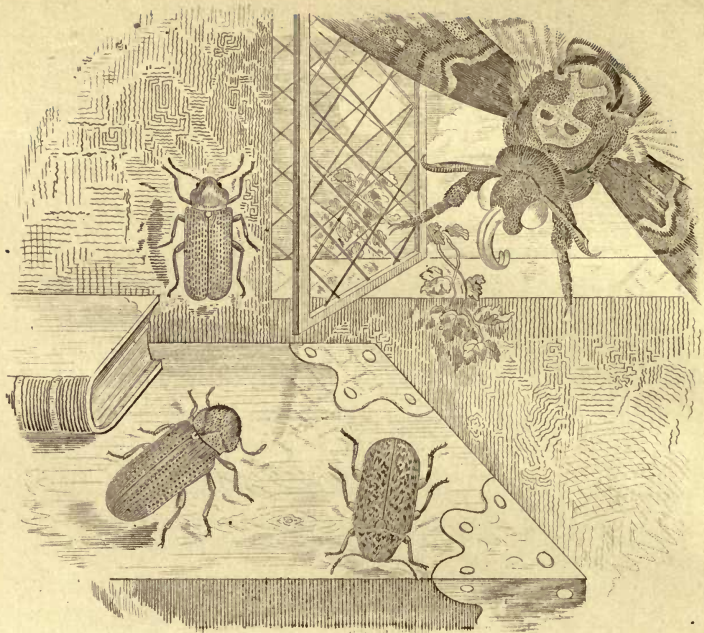
There is another set of little *leaping* beetles, called *Histeridæ*—also spring visitants—whose exterior is really much more prepossessing than their resorts and practices would lead one to expect. Some of these present us with exceedingly pretty specimens of nature's sculpture; and, from their habit of contracting the legs and antennæ immediately upon being alarmed or touched, resemble, when thus indrawn, a carved seed (usually black, or black and red) rather than a carved insect. Hence derived are their familiar names of "Pill" and "Horse-bean beetles."¹

Flies are usually the next agents of consumption, followed by a host of other beetles.

¹ *Histeridæ*.



The *Scarabæus*: an amasser of filth, fit emblem of Mammon-worship.



Entering at the open casement, appear the head and shoulders of a Death's-head Moth (*Acherontia Atropos*). The table below is occupied by two Death-watch Beetles (*Anobium tessellatum* and *A. pertinax*), while another (*Anobium striatum*) is creeping up the wall above. All three are drawn much larger than life.

INSECT DIRGE-PLAYERS.



At the open window of her solitary kitchen, half lighted by this October moon, half by a flaring candle, sits All-work Deborah at her tea. Why, suddenly arrested in its prophetic orbit, does the tea-cup, in the very turn of fortune, drop, shivered, from her shaking hand? Why does her tallowy dip dip at once into darkness? What is the wailing cry that salutes her startled ear? Is it the voice of a screech-owl from the barn, or the squeal of a mouse from the cupboard? No! It is the shriek of some gloomy night-flier, which, entering at the casement, has put out the candle,

and deposits its dusky form upon the snow-white dresser. Deborah can only dimly discern it by the help of the moon. "Oh, for a light!" she inwardly ejaculates; but evening is warm, the grate is cold, and the damsel dares not stir.

At length, however, in some way or another—the candle is relit. With trembling hand she places it on the dresser, to "show up" the characters of her alarming visitant, who ever and anon continues to salute her with its mournful wail.

Deborah is a country girl, and has therefore learnt, of course, to distinguish betwixt a butterfly and a black beetle; and she thought, till this awful moment, that she knew, quite as well, the difference between a brown moth and a spirit, black, white, or grey. That the thing upon her dresser is a moth, of size prodigious, the candle seems to tell her; but there, as it lies, vibrating its dingy pinions in unison with its dismal cry, somewhat else seems to tell her that it is no moth at all, or a moth of most strange unnatural behaviour, not at all to her liking. Whether to rid herself by fair means, or by foul, of her unwelcome guest, "that is the question." By alarming, to drive away, she might bring the creature in her very face, or on her very back; better at once to "end it." So Deborah screws up her courage,—seizes on a knife,—approaches with a murderer's step her now quiescent victim, and with a dexterity, under existing circumstances, perfectly miraculous, severs its head from its body. Then, as though a coffin had popped from out the grate, bounds Deborah from the dresser with a piercing scream. Most marvellous!—most horrible!—She hears again, louder and more doleful than before, that melancholy cry, and it is the moth's bodiless head, or headless body, from whence it issues. She lifts the candle—holds it nearer to the object, the now twofold object of her terror—she looks—she listens—perhaps her ears, or eyes, or hand, had played her false; but, no! they and her murderous weapon had all been true:—here lies the head, there the body,—and, sure enough, too, the head still wails as if in suffering, and the body heaves, and the dark

wings quiver, as if in indignation. But it is not alone these quivering pinions which impart a motion like their own to Deborah's whitened lip. It is not even the wail of that dis-severed head which causes her heart to beat like a muffled drum, in accompaniment of its plaintive pipe; but she sees—she sees, plain as the effigy on Master Thomson's new tomb-stone—right on the creature's back, between its shoulders, *another* head—an eyeless skull—magnified, by terror and consciousness of cruelty, into size above the human. Poor Deborah beholds no more—she has seen and heard too much, and falls, plump as her person, on the kitchen floor. There her mistress, after having by reiterated peals broken the parlour bell, was the first to find her. In due time, this veracious tale of wonder was gathered from the domestic's lips; and in the mutilated object of her alarm, was discovered the decapitated corpse—of a Death's-head Moth.

Next, in the power of raising superstitious terror, and as more common than the last, an agent of creating it more extensively, comes the "Death-watch," that pocket time-piece of the grisly monarch, heard, not seen, whose measured tick—tick—gives warning of its master's soundless footsteps. What hollow echoes are awakened by this monotonous midnight music!

Let us now inspect them in a calmer and clearer manner.

First, for the Death's-head—the Sphinx or *Acherontia Atropos* of the entomologist. And here, in the largest of British moths, we have a beautiful insect of richly variegated plumage,—bird-like in magnitude—the "wandering bird" of Poland.

In the upper wings, which, when expanded, cover an extent of nearly five inches, the prevailing hues are very dark, but elegantly disposed in waves and shades of brown and black, broken by a few lighter clouds, and one small white spot near the centre. The secondary pinions, of less sombre colouring, are of a deep ochreous yellow, barred with black; a livery in which the massive body is also attired. The head and thorax

are dark, and it is on the back of the latter that the insect bears its dreaded badge, the death's head, to which it owes its name, figured in yellowish grey upon a sable ground.

The power possessed by the death's-head of emitting sound (a gift rarely, if at all in any other instance, bestowed upon its race) gives to this singular moth another fancifully imputed attribute of the supernatural; and the character of its voice, if voice it may be called,—loud, shrill, and wailing,—invests it with an accordant tone of evil augury. However fanciful its prophecy of ill to others, the lament of this unusually complaining creature would seem to be a real expression of being ill at ease itself, since, according to Réaumur, when “shut up in a box, it cries; when caught, it cries; and when held between the fingers, it never ceases crying.”

Naturalists have been sorely puzzled and widely at variance as to the organs producing this frequently-employed voice. One supposes it to proceed from the body; another thinks it is produced by friction of the chest upon the abdomen, the wings having nothing to do therewith; a third, *tout au contraire*, supposes he has discovered the organs of sound in a pair of scales at the wing's base, played upon by the action of the pinions themselves.¹ Réaumur opined that the cry proceeded from the insect's head, its immediate source being the friction of the palpi against the tongue. Passerini, Dumeril, and Duponchel, have traced the origin of the sound to the interior of the insect's head; from which, according to the statement of the latter, the sound continues to proceed on separation of the body.

Yet later than all the above varied opinions, and only accordant with one, comes that of Mr. Denny, according to which, the true organs, producing the death's-head's melancholy strain, are two large moveable horny scales, at the bases of the upper wings, fixed on the thorax, and covering each a small aperture, which is also a horny substance. In proof that the vibration of

¹ M. De Johet.

these scales causes the sound, it is stated that during its emission they, only, are in a state of strong vibration, while all other parts of the insect may be at rest.

September, or the present month of October, is the season, usually, when the *Acherontia Atropos* assumes its winged form, and may be found, occasionally, resting in daytime upon trunks of trees, or, attracted by the taper's light, visiting our houses, where their phantom forms are, now, much oftener welcomed for their rarity and real beauty than dreaded for once imputed terrors.

Invested, through the mortal emblem on its tabard, with the imaginary office of herald to the Fates, disease and death were anticipated in the wake of its heavy pinions, or thought to be announced by its mournful cry. A whole sisterhood of nuns could be terrified by the apparition of a single death's-head within their holy precincts; and a parish priest, desirous to work by terror on the consciences of his flock, could find for his purpose a powerful instrument in the appearance of this harmless insect, which, in the year 1730, was described by a curé of Bretagne, as "*revêtu de tout ce qu'une pompe funèbre offre de plus triste.*" Even its wings appeared to his deluding or deluded fancy, to be, "*marquetées comme une espèce de drap mortuaire.*"

The caterpillar of the death's-head moth is one of the largest and most beautiful of its tribe, and presents, in its brilliant colouring, a striking contrast to the lugubrious colouring of its perfect form. It is of a fine yellow, obliquely barred by seven green stripes on each side, with intervening lines of blue and black spots. It has the pointed tail-like horn common to hawk-moths, and is endowed, moreover, as in its perfect state, with the gift (boasted, we believe, by no other caterpillar) of a *voice*; for it is said by Kirby that if disturbed, it draws back rapidly and emits a loud noise, which may be compared to the crackle of an electric spark. Its favourite food is furnished by the leaves of the jasmine and potato; and, with

the increased cultivation of the latter, the death's head has become of late years less scarce than formerly.

The caterpillar is said to feed also on hemp, elder, and the woody nightshade. It is mentioned in the "Cambridge Chronicle" of September 1846, that Mr. Demny took twenty of the full-grown larvæ from off a tea-tree, growing on the top of a house at the back of Downing-terrace, all of which he successfully reared into splendid specimens of their kind.

These caterpillars, as well as various others, are apt to elude the search of the collector by taking refuge during day-time from the sun's rays and the darts of ichneumon-flies, not merely under the leaves they feed on, but in the earth beneath them. To the same bed they retire towards the end of August or beginning of September, and, forming therein their smooth untapestried chambers, put off their gay attire for chrysalidan covers. From these, as we have seen, they burst in autumn, harbingers of wintry death, at least to the vegetable world.

The ominous Death-watch, when drawn from its hiding-place in old perforated floor or wainscot, picture-frame, chest, or black-lettered volume, comes forth (a mouse from a mountain of fear!) a tiny beetle of some quarter of an inch in length, and in its prevailing hues of grey and brown resembling the colour of the time-worn wood, whose decay they help (especially in their grubhood) to accelerate. That alarming "tick," to which at midnight many a timorous heart has beat in unison, is generally to be heard first in May, and on to autumn, by day as well as night, and, being considered analogous in purpose to the "call" of pairing birds, has, in reality, as little of ominous about it. The sound is not vocal, but consists of a series of quick successive beats, produced, usually, by the striking of the insect's mailed head upon the hard substance whereon it may be standing, or into which it has penetrated, most likely, while a grub. Some have supposed the grub itself to be the drummer, but, if this sometimes be the case, the perfect beetle is a drummer too, various accurate

observers having been eye as well as ear witnesses of its performance.

There are various species of these ticking, or more properly beating, beetles, of the genus *Anobium*, of which a marked characteristic is the concealment, nearly, of the head beneath the thorax. Amongst these, two noted drummers are distinguishable by their uniforms—in other words, by the markings of their wing-cases,—which in one ¹ are striated, in the other ² tessellated. Another of a plain dark brown (*Anobium pertinax*), frequent in holes of old wood, has long been famous for its pertinacity in simulating death, and for displaying a seeming indifference to torture, comparable only to the American Indian. De Geer affirms, upon experiments which it needs not to repeat, that “you may maim, pull limb from limb, or roast over a slow fire this pertinacious creature, and not a joint will move in token that it suffers. A curious instance, this, of the unconquerable power of an instinct implanted for self-preservation.”

However insignificant in their imputed attributes, these wood-boring beetles are by no means despicable in their actual proceedings. Where abundant, not only chairs, tables, and books have been reduced to powder, but even buildings have suffered from their combined agency. Curtis mentions the roof of King's College, Cambridge, having been seriously damaged by their operations, and thinks that the same species (the *Anobium tessellatum*) has been known to cut through sheet-lead.

Such is the living main-spring of the death-watch when taken from out its wooden case; and though all its terrors vanish on being brought to light, it is easy enough to account for their origin in connection with place, time, and circumstance.

Most heard in old (perhaps *haunted*) houses, proceeding from wainscot or from bed's head, perhaps from picture-frame

¹ *Anobium striatum*.

² *Anobium tessellatum*.

of grim old portrait, as if the "tick, tick," of the invisible time-piece issued verily from the lace-fobbed pocket of some buried ancestor; or heard, possibly, with creeping awe, to proceed, "tick, tick, tick," from the elm-wood of a coffin before consigned with its mute tenant to the earth; heard, too, by night-wakers, the sick and the solitary, or night-watchers keeping their vigil beside the dying or the dead,—who can wonder that, with such concomitants, the hearts of the ignorant should have often, and may sometimes still echo, fearfully, the beat of the death-watch? And, perhaps, with all our little knowledge, our own might, under the like circumstances, do the same.

Thus much for the wailing pipe and monotonous tabors of our "Insect Dirge-Players."



Phantoms foot it to the Death watch drum.



The insects chosen for this Vignette are such as afford examples either of longevity, of brevity of existence, or of great disproportions in the length of its several stages. The Brown Weevil (*Curculio*), a feeder on decayed wood, at the right hand corner, gives an instance of longevity, contrasted by the brief duration of the Ephemeral Day-fly (*Baëtis*), which rises upwards on the left. In this Ephemera there are two instead of (as in *E. vulgata*) three filaments, proceeding from the extremity of the body. On the right, is a common Cockchafer (*Melolontha vulgaris*); another of the same species, just arrived at maturity, is pushing upwards from the grass; while, a third, yet in its stage of larva, is exhibited in the ground beneath. In this, its form of imperfection, it exists within the earth for several years, living in the air as a perfect insect for perhaps a fortnight. On the oak-leaf to the left are two leaf-galls, one exhibiting its enclosed grub—a long liver, as compared with the little Gall-fly (*Cynips Quercus folii*), which is seen in upward flight above.

SHORT LIVES AND LONG.



OUR chosen emblems of fragility are flowers; and, fixed by the laws of their creation to one spot, where they bud, and bloom, and wither beneath our eye, we have been compelled, almost, to notice their brevity, and are sensible, at times, of the moral odour which exhales from the union of their beauty and fragility.

In the world of insects, examples of existence, bright and brief and most precarious, are no less common, and in many respects (especially as occurring amongst sensitive beings) infinitely more striking; but, except with those sporters of a day, hence called *Ephemera*, the frail tenures of insect life seldom serve to remind us of the like nature of our own, and chiefly, perhaps, for the following reason. Many a brilliant flutterer is cut off in the midst of its joyous activity, much more suddenly than the flower over which we have seen it hover, but ere the scattered petals of the one have strewed the surface of the ground, the wings of the other have borne it to die unseen within some hidden covert; or, contributing in death to the support of life, it may have sunk suddenly into the devouring gulf of some insectivorous bird, or carnivorous feeder of its own race.

It is, by the way, a remarkable dispensation of Nature's Author, and one equally beautiful and kind, that while Death is for ever busy, as elsewhere, in the lower departments of the animal kingdom, so few of the victims they afford him are permitted to offend the eye in any shapes of disgust or danger. To confine this observation merely to insects:—We see the air teeming with gnats; the ground populous with ants and beetles; the fields, especially towards the end of summer, alive with grasshoppers and Tipulidan flies; the hedges, through the months of June and July, scarcely more abundant in leaves than in the smaller moths, which in daytime make a covert of their foliage: and of these countless myriads we are told, truly, that even of those among them permitted to reach their good old age, scarce a single gnat survives a week; not half the beetles, nor any of the *Tipulæ*, nor grasshoppers, a month; while few are the butterflies or moths which over-live a fortnight. What has become of them? may naturally be queried by those who bestow upon the subject a mere passing thought; and though with those who have learnt something of insect history the marvel is greatly diminished, it still remains

matter of some surprise, that of the myriads which die daily round and about our paths, so few "mortal remains" should meet our eye. Something, in short, of the same sort of mystery is attached to their entire disappearance as that which seems to have been noticed by some of old Fuller's "worthies," with regard to the disappearance of pins, which caused them to admire "that so many millions of these useful and neat little articles made, sold, used, and lost in England, should vanish away invisible;" to the which remark, our excellent divine, with gravity becoming his profession, and quaintness belonging to his style and character, appends this serious reflection:—that such persons may rather wonder how so many that wear them, being no more than pins in the hand of their Maker, do decay, die, and slip down in the dust in silence and obscurity.

The duration of insect life varies greatly; but there is one remark respecting it of very general application:—Its last and most perfect stage is usually the most brief, often immensely disproportioned to those which have preceded it.

A few instances do, indeed, occur, of insects being very long-lived after their attainment of a perfect form; but these are, for the most part, to be found, not among the gay and gaudy flutterers of air—not among the livers upon sweets ambrosial quaffed from painted flower-cups, not more fragile than themselves—not among the baskers in the sun, or the sporters on his beams; but rather amongst the dull, lugubrious, sober-suited crawlers which lurk in the dark places of the earth and the dark corners of our habitations.

An individual spider may often, it is probable, live long enough to lie in murderous wait for flying innocents, even to the fourth and fifth generation. Goldsmith, indeed, mentions one as having lived three years; and though his authority on this, as well as on other matters, especially of natural history, has been often called in question, Audibert is also stated to have kept another quite as long.

Some of the weevils—a tribe of beetles distinguished by their long beaks, or rostrums—can also boast themselves of a span of life comparatively long. One of these, found upon rotten wood, the substance which it feeds on, we have kept under a glass from June to the April following, when it escaped. This, also, though it has not once grown torpid, may be considered as an insect of gloomy and retired habits, and, like others of its family which live in wood or earth, is of sombre dark-brown hue;¹ in this respect, strikingly contrasted with the gayer colouring—usually a vivid green, sometimes red—displayed by that more cheerful division of the same tribe, which is used to frequent and feed on trees and plants, in open daylight, and which die, probably, with the leaves and stalks whose sap constitutes their wine of life.

It would seem, then, that the highest apparent degrees of vitality, sensitiveness, and enjoyment, are seldom, in insect life, made to consist with long duration. With them, to live *long* is not always to live *much*, though we may justly say of them, as of other and higher existences, that to live much is to live long.

The *Ephemeræ*,¹ for instance, in their single day of light and love—as tenants of the air—may be said to live longer than in the darksome years of their immurement within earth and water; while the butterfly, fluttering over the flowers of the grave, may enjoy more of existence in that short half-hour of sport and sunshine, than the churchyard beetle in the whole course of its buried career amongst the relics of mortality.

In this seemingly disproportioned, yet in reality well-balanced allotment of insect life, there exists, as we have noticed, no parallel with the history of the soul, viewed as an immortal principle; but amongst the instances just adduced, as well as a thousand more, there is not wanting a very marked correspondence with the earthly tenures of human existence as most usually holden.

¹ See Vignette.

Which are the lamps of clay found, commonly, to be the soonest broken, and most early committed to their congenial soil? Common observation answers, Those, certainly, in which a brilliant flame has served to exhaust most speedily the animal oil whereon it fed. George Herbert said of himself, that he had "a wit, like a penknife in too narrow a sheath, too sharp for his body;" and the remark is of general application.

In the case of our old poet and divine, the "sheath," indeed, proved of tougher material than he seemed to anticipate, for long afterwards, writing about spring flowers (those favourite emblems of fragility) he says beautifully and devoutly—

"And now in age I bud again,
After so many deaths I live and write;
I once more smell the dew and rain,
And relish versing. Oh, my only Light!
It cannot be that I am he
On whom thy tempests fell all night.

"These are thy wonders, Lord of love!
To make us see we are but flowers that glide,
Which, when we once can find and prove,
Thou hast a garden for us where to bide."

Opposed to those who, whether their span of life may have been short or protracted, have lived, like the active May-fly, all through their day, there are multitudes over whose remains the well-known epitaph or epigram (from Camden) which heads our observations might seem appropriately placed.—

"Here lies the man—was born, and cried,
Lived sixty years—fell sick, and died."

Yet is even this, on our present principle of reckoning, a memorial by far too eulogistic. "*Lived sixty years!*" Why this crawling creature, who ate and slept away existence, did not live sixty years, nor a sixtieth part of them. Only compare the weary grub-like stage of such a creeping dullard, with the winged career of a Chatterton, a Kirke White, a Shelley, a Keats, and other brilliant *Ephemera* of a poetic sky,

and say—if life be computed by the amount of actual living, by *state*, which, to *mind*, often annihilates and stands in the place of time, by spiritual measurement instead of by finger calculation—whether the balance of longevity, in its proper sense, may not incline rather to the span of twenty than of sixty years.

Many curious experiments have been tried successfully in the prolongation and curtailment of insect life. In some cases, starvation, that agent, usually, of destruction, has been found, by retarding the completion of its accustomed stages, to lengthen the journey of existence to our little fellow-travellers. The larva of an aphidivorous fly, placed by Kirby under a glass, where it was left inadvertently without food, was found alive three months afterwards, living eight times as long as it would have done in the combined periods of its usual uninterrupted stages.

Cold was also an agent employed by the French naturalist Réaumur to retard the emergence of butterflies from their aurelian cases, and thus prolong the duration of their life—if we may apply the term to a state of apparent torpor. The chrysalis of a nettle butterfly, which usually emerges in a fortnight, being placed, with others, in a cellar, remained two months before exclusion.

On the other hand, by the agency of heat, the naturalist—who, through the exercise of this curious power over life and death, would seem, in a measure, to command nature—can abbreviate instead of prolonging the term of existence. Enclosing his chrysalides in the interior of a glass egg, Réaumur called in the assistance of a brooding hen to hatch the butterflies he willed into a prematurity of perfect form, some of which appeared, accordingly, in four, instead of fourteen, days.

From experimental facts and philosophical deduction, the lively French naturalist wanders into imaginative speculation on the probable results of some such life-influencing power in its application to the human race. First, in the case of abbreviation: “A child,” he remarks, “would have little reason to

complain of a father who might be enabled to force him, in a few weeks, into a maturity of endowment, bodily and mental." He says, "Qui nous ôterait nos premières années, qui les ferait passer en quelques jours, nous ôterait peu. *Qu'est ce que c'est que de vivre alors?*"

So much for the curtailment, at its commencement, of life's unfolding roll; and the power of its voluntary extension would, we fancy, prove a privilege scarcely more desirable.

To put a case parallel with the artificial lengthening of insect life, we must, of course, suppose the extra period to be passed in a state of torpor. On these terms, the addition even of centuries to our three-score years and ten may appear only a nominal gain, since, as our French naturalist justly observes,—*"It is only the conscious train of thought and feeling which constitutes our real existence."* To some people, however, he adds, it might appear exceedingly agreeable to live, even on the condition of torpid intervals, for ten or twelve ages, having in each a few years of active life.

What changes in the face of nature, art, science, manners, tastes, and fashions would such persons behold; and how, in all these matters, would each succeeding period enlarge upon the tale of wonder told by its predecessor!

Only imagine a courtier, a lord in waiting on King George the Third or his consort Charlotte, awakened from a nap of only fifty years, to fill the like office in the court of our Sovereign Lady. Verily, upon opening his eyes on the strange things around, they would be stretched beyond power of reclosing. Suppose him called on to attend the Queen in one of her frequent "*progresses*;" well might such a sleeper awakened rub those distended eyes, and doubt his wakefulness, on beholding his royal mistress step into what appears to his bewildered sight some palace of enchantment, wherein she, and he, her astonished satellite, are forthwith whirled along; by—what? surely, he believes, by some obedient slave, invisible, of lamp or ring; for how can he have dreamt, in his dreamless

slumber, of the slave of the kettle—that giant genius, Steam, which had arisen, while he slept, at the bidding of the magician, Science, to make a button, to compound a pill, and to transport a sovereign?

Or suppose an individual of the present day, thrown by mesmeric or ethereal influence into a deep, dead, *bonâ fide* slumber, for the remaining half of this nineteenth century, who shall venture to imagine the astounding marvels on which his eyes would open at the beginning of the twentieth? Marvels, vastly curious and amusing in the speculative distance, but of which the close reality might be attended by various sensations something less agreeable. The old-fashioned courtier would feel awkward enough in the position we have just supposed amongst his modern brethren of the suite; but how infinitely more so one of these latter under circumstances wherein the lapse of another half-century might place him, when called on, perhaps, to attend his sovereign—if sovereigns there be, or if sovereigns then have lords in waiting—in a state balloon!



The threads of Insect Life are variously apportioned.



On the right, creeping down the bank, is a common Glowworm, the wingless female of a beetle (*Lampyris noctiluca*) which is seen descending from the corner opposite. Beneath, crawls a luminous or electric Centipede (*Scolopendra electrica*); and near, in the centre of the foreground, is one of our native Click Beetles (*Elateridæ*), not (as represented by mistake) a luminous insect, but closely allied to, and much resembling, the Fire-fly (*Elater noctilucus*) of the West Indies and South America.

STARS OF THE EARTH.



THE attention of philosophers was in very early ages directed to various phenomena resulting from the properties of light, and, amongst others, the remarkable phosphoric appearances of certain animal and vegetable bodies. Ancient writers allude in general terms to the existence of luminous insects, of which the species most early known is supposed to be the Linnæan *Lampyrides*, or flying glowworms,

abundant in the south of Europe, as well as in Asia and some parts of Africa. The Greeks included all shining insects under the name *Lampyris*, and the Latins called them *Cicindela*, *Noctiluca*, and *Lucciola*, under which latter designation the flying glowworms are still known in Italy.

With the *Fulgoræ*, or lantern-flies, the ancients are thought to have had no acquaintance, for, though Asia produces a few species of them, the most remarkable are peculiar to the warmest parts of America.

The great lantern-flies spoken of above belong to that order of insects termed *Hemiptera*, being allied, unlike as they may seem, to bugs, boat-flies, and water-scorpions; but the fire-fly of the tropics, being of the order *Coleoptera*, is a beetle. By day, as sombre and dull-looking a little animal as any to be seen; shape, longish; colour, blackish brown. When at rest, or walking, it is content with the display of only two lights, emitted from a pair of lamps, or yellow tubercles, placed on either side the chest; but when, with wings extended, it shoots across the dusky sky, another luminary, also in the thorax, but seated further back, is rendered visible.

Though we have none of these fire-flies, as yet, in England, we have certain insects of the same family, which in all, save luminosity, greatly resemble them. These are the very common longish brown beetles, known familiarly as "spring and click beetles," also "skip-jacks"—names expressive of their power, when laid upon their backs, of springing or leaping into the air, with a clicking sound.

Our readers, as we hope, all know by this time, that every beetle has been in its time a grub or larva. They have all heard, too, most likely, of that farmer's terror, the destructive wire-worm; but to some, even amongst farmers, it may possibly be a piece of information that this wire-worm is none other than the beetle grub, and the grub, moreover, of *such* a beetle as the click, or skip-jack, an *Elatér*,¹ nearly resembling the tropic

¹ See Vignette.

fire-fly; the grub of the latter loving to feed on the roots of sugar-canes (to which, says Humboldt, it is often very injurious), in lieu of the roots of corn and other vegetables, the favourite fare of his British relative.

Like the tropic fire-flies, these glowworms are beetles, though of a different family, that of the *Lampyridæ*, of which the *Lucciola* is a very small species, with blackish-brown wing-cases; the legs, as well as thorax, of which the shield nearly hides the head, being reddish yellow. The light of these insects, when creeping, or perching upon trees, is described as being hardly perceptible, but becoming brilliant on flight; not constant, but scintillating, as if disclosed on successive expansions of the wings. Appearing with the twilight, their full radiance shines forth in darkness; when some, shooting through the air, make luminous tracks in all directions, while others spangle the shrubs and herbage.¹

Their appearance and effect in the neighbourhood of Genoa has been thus described by Sir J. E. Smith :²—

“On the eve of St. John the Baptist, the great festival of Genoa, the town was brilliantly illuminated, while along the purple coast to the west, the last rays of the setting sun still trembled on the hills, and the moon arose in the east. To these three contrasted lights was added the singular effect of innumerable flying glowworms darting their momentary splendour through all the streets, gardens, and rooms. We used frequently to catch these little insects, and entangle them in the ladies’ hair and head-dresses, a decoration which the women of some countries adopt for themselves.”

Our English glowworm³ (as we presume most people are aware) is the wingless female of a winged beetle, which also carries a light, though one of much inferior lustre.⁴

¹ See “Naturalist’s Library.”

² In “Sketch of a Tour on the Continent,” quoted in “Nat. Lib.”

³ *Lampyris noctiluca*. See Vignette.

⁴ A solitary glowworm, resembling the English, but much larger and more brilliant, was seen by Bishop Heber in Ceylon. He makes no mention of lantern-flies.

Cui bono, the lady's taper? To answer this inquiry Conjecture has been clever, but, as usual, often at variance with herself.

While it is supposed by some that the light of the wingless beetle is bestowed for her protection, to scare away her hungry foes, the nightingale and other birds of night; it is opined by others, that the insect's gift of brilliancy (like many of the like sort bestowed upon mankind) is the very mean of her destruction, the very lure and light by which her biped foes are assisted to discover and devour her.

Some people, again, have suggested that, whatsoever else its purpose, the glowworm's luminary may be employed as a lamp for her own supper-table, after having previously lent its aid in the finding of her evening meal. It has been observed, indeed, that, for the serving of both such uses, her light would have seemed placed more conveniently at head than tail; but its diffusion, we should think, is amply wide enough to render this objection of little import.

The *Lampyridæ*, even of our northern climate, have southern predilections, being never seen in the north of Scotland, and most universally abounding in the southern English counties.

To most of the dwellers in these her favourite resorts, the person of our insect lamp-bearer, so conspicuously displayed in her own light, must have been, we should suppose, familiar (as with ourselves) from the summer nights of childhood,—from that night, in particular, never to be forgot, which first brought one of these shining mysteries within the compass of our fingers and a box. While of other little creepers we yet scarce knew the difference betwixt head and tail, the figure of our first captive glowworm, as seen at night, and examined next morning, almost before daylight served, was stamped upon our memory; and, had we never seen another since, we should not forget her tiny head, and, as we called them, horns, mocking our curious eye, as she just put forth and then with-

drew them under the shielding back-plate which covered the fore-part of her body ; that slate-coloured, oblong, flat, wingless body, all divided into rings, and bearing at its nether extremity the *lamp*,—by night a lustrous emerald, by day a dull pale spot,—composed, as we have learnt now, of the sulphur-coloured substance which supplies its light.¹

Of this article, by the way, though it cost her nothing, the glowworm, it would seem, is somewhat economic; Gilbert White, at least, confirmatory of Will Shakespeare, having thought that she always puts out her light at the decent hour of eleven or twelve, or begins then, according to the poet and the poetic idea, to “pale her ineffectual fire.”

Now for a word or two,—borrowed, of course, from the scientific page, but considerably at variance,—respecting the supposed nature and quality of this and other insect fires. One experimentalist,² having found that the glowworm’s light is neither diminished by immersion in water, nor increased by application of heat,—that it is not capable of ignition by the flame of a candle, nor possessed of any sensible heat when separate from the bearer’s body, denies in this luminous matter the existence of any ordinary composition of phosphorus; suggesting, however, that the above facts are favourable to the supposition of light being a quality of matter, rather than a substance.

Another examiner,³ on the contrary, seems to have ascertained that the glowworm’s light-diffusing substance is chiefly albumen, combined with a portion of phosphorus; and as phosphorus can only become luminous by contact with oxygen (supposing it uncombined with a fatty matter or albumen), he considers this requisite supplied by means of the male insect’s respiration, which is strongest during flight; while, in the female, which flies not at all, the greater quantity of albuminous

¹ See Vignette.

² Mr. Macartney, quoted by Kirby and Spence.

³ Mr. Macaire, quoted in “Naturalist’s Library.”

substance contained in her thick body more than compensates for the lesser respiratory action.

Enough, at all events, has been ascertained about the illuminating matter of the glowworm's lamp to prove it perfectly incapable of setting light to any tapers, save those of fairy manufacture. Who could quarrel with that pretty conceit of our immortal Bard, which converts, "the glowworm's fiery eyes" into lucifers, for the use of Titania's household? Yet, in our character of entomologist, we may, perhaps, be permitted to observe, that Shakespeare has here taken more of poet's licence than he is wont to do in his allusions to natural objects, which are in general so infinitely more correct than those of his modern brethren of the lyre. It is admissible enough to term "fiery" what looks luminous, but it is a long stretch, truly, even to the length of the creature's antipodes, to endow it with "fiery eyes," in lieu of a fiery-seeming tail.

Before having quite done with "fiery eyes," we may notice that if the "Swan of Avon" had applied this epithet to the moth instead of glowworm, his fancy would have better corresponded with fact; for a fact it is, though probably quite unknown in the days of Shakespeare, that many species of night-flying moths are endowed with luminosity in the organs of sight, the light being most visible while the insect is in motion.

"Pour l'amour de ses beaux yeux," we may perhaps, therefore, include the moth among luminous insects; but there is another, a native of England, perhaps as common as the glowworm, which, although from its habits comparatively little noticed, shares her luminous endowments to a very considerable extent. This is the electric centipede,¹ a black, many-legged crawler, which almost everybody must have seen and shrunk from, as it has crossed their path in the day-time. As this

¹ *Scolopendra electrica*. See Vignette.

creature (which has been likened to a miniature model of a serpent's skeleton) moves, serpent-like, forward or backward, he leaves behind him, or before him, a tangible track of the phosphoric light, which, in darkness, strongly illuminates his unsightly form; but, as if conscious of his loathly aspect, it is mostly in daylight, when it is least conspicuous, that he issues from his lair, some abode of darkness, either in the earth, or beneath a stone.

The Mole Cricket is another insect which has been supposed to emit light; to have been, indeed, in some cases, the veritable Jack o'Lantern—the *ignis fatuus* of the benighted traveller.

The harmless quality of all these insect lights is a kind provision of Nature, no less adapted than a variety of others to attract our admiring notice. Truly, it is a thing wonderful and beautiful, to find in animated forms a substance so nearly resembling that formidable element, fire; one possessed of its power to diffuse light, yet wholly destitute of its dangerous properties.

Have luminous insects the quality of *use*? In common with all created things undoubtedly they have, and to themselves their luminaries serve clearly some important purpose, however we may yet be in the dark as to their exact mode of appliance. Nor, as regards mankind, are these “diamonds of the night” altogether without their value, having, as such, been made in several countries subservient both to ornament and use.

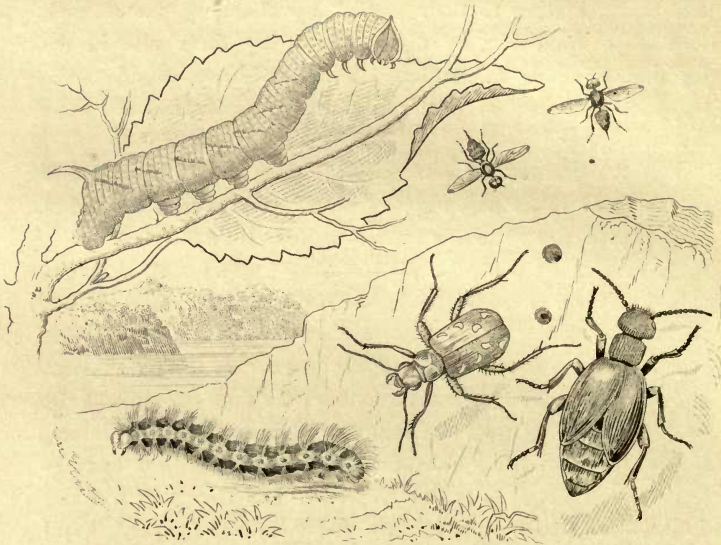
While our native glowworms have begemmed no other beauty but that of the sleeping wild-flowers, the tropic fire-flies have sparkled in dark tresses, and been rivalled by flashing eyes,—have been employed by the gay in the decoration of festive garments, and by the grave in the conning of small print. The Père du Tertre, in his history of the Antilles, speaks of reading his Breviary by the light of one of these living lamps. The natives of St. Domingo, and other islands, are also said to have used them literally as “a light to their

feet and a lantern to their paths," by attaching one to each foot when travelling by night, employing them also in the lighting of their habitations. Fire-flies serve, besides, the important purpose of destroying mosquitos, which are their favourite prey.

But the glimmer of our English glowworm? *that* surely can serve no other uses save its own? *She* would be a dull diamond in the maiden's tresses—a dim light to read by—a sorry lantern on a murky night. True; but for all that, she shines not for herself alone: for us, also, her light is not without its uses. What these are we may best answer when returning from our summer's evening walk, as the glowworms and the stars are coming out together; for then our minds must be more creeping than the wingless light-bearers themselves, if they rise not from *them* to the glorious orbs they humbly imitate, and thence to the Great Source and Centre of Life and Light, from whom alike emanate the "stars of the earth" and the suns of the universe.



Inquire we the uses of the Glow-worm's lamp.



The examples of slow and swift-footed beetles here given, are the Oil-Beetle (*Meloë vulgaris*), laboriously creeping up, and the Tiger-Beetle (*Cicindela campestris*), rapidly descending the sandy bank. Below, is a fast walker, almost runner, among hairy caterpillars, and above, on a lime-tree twig, sits the stately larva of the Lime Hawk Moth (*Smerinthus Tiliæ*), like the rest of its Sphinx-like brethren, slow-footed and averse to motion. The two flies are of a flower-resorting species, called vibrating (*Scioptera vibrans*), which are distinguished by 'red heads, scarlet eyes, black-tipped wings, and that quivering or vibrating motion to which they owe their name.

INSECT MOVEMENTS.



N their endless variety of movement, the Insect races resemble, equal, and in many cases surpass, nearly every other animated tribe of earth, air, and water. They walk with the quadruped; fly with the bird; crawl with the reptile; swim with the fish; do all, in short, but march erect,

like the man and the monkey; while many of them are endowed with motive powers of a kind possessed by no other living creatures with which we are acquainted.

But the best way, perhaps, to obtain a tolerable notion of the extent and perfection of insect activities will be to divide them into two classes, the one consisting of movements common to other animals, the other of those nearly or quite peculiar to themselves.

First, for that most ordinary mode of progression, walking. This, among insects, (most of which are possessed, in their perfect state, of six legs) varies in rate or pace from the slowest creep to the swiftest run. The *Coleoptera*, or Beetle-tribe, alone furnish instances of each degree of progression exemplified in its extremes by the laborious creep of the oil-beetle,¹ overwhelmed, seemingly, by oozing fatness, and the light, rapid, agile course of the predatory *Carabus*,¹ or that of the rapacious *Cicindela*, resembling

“The forest’s leaping panther,
Fierce, beautiful, and fleet.”

Some butterflies—amongst others, the little “Tortoise-shell”—may be designated insect quadrupeds, inasmuch as of their six legs the two foremost being very short and imperfect, four only serve the purpose of walking; an accomplishment, by the way, in which butterflies in general, like the ladies of England, do not particularly excel. If rapidity of pace depended on the number of instruments employed in walking, both butterfly and moth, in their estate of caterpillars, would always outstrip, as pedestrians, their own winged maturity, sixteen, instead of six or four, being the number of legs with which caterpillars are usually provided. This, however, is only the case in certain instances, for hardly do beetles exhibit greater variety in their rates of movement than the larvæ of *Lepidoptera*. We

¹ See Vignette.

speak, indeed, of all caterpillars as “crawlers;” but while some “drag their slow length along,” tardy as the tortoise, or that

“Enfant la terre errant sur le gazon,
Privé d’os et de sang, et portant sa maison,”

others run with the rapidity of “the Hare,” an appellative really bestowed for its swiftness, on a foreign species. There are not wanting English runners of the same description. We may notice, amongst them, as a very common specimen, a caterpillar (that, we believe, of the Large Ermine Moth) with a skin blackish or greenish, striated in its length by a broad white line on either side, and thickly covered by a coat of long brown fur, made up of tufts proceeding from studs or tubercles.¹ This, one of the pillagers of promiscuous cates of an herbaceous description, may frequently be seen by roadside or in garden, and usually in company of several messmates, employing his jaws with prodigious celerity on the leaves of dock, plantain, dandelion, marigold, or violet. If we rudely interrupt him in his harmless feasting, he rolls up *instantly*, and falls from his station—a defensive feint of death or inactivity, from which, presently, he betakes himself to flight, and runs, or more properly glides, away with a degree of celerity which leaves no doubt of the excellent use he can make, on occasion, of his eight pair of heels.

As one of the foremost—hindmost, rather—of the creeping caterpillars, has been noticed that of the Hawk-moth, *Filipendula*, and the majority of its Sphinx-like brethren,¹ are slow footed as well as averse to movement.

Flies, wasps, and ichneumons, may be all considered runners; but, in accordance with that system of compensation so generally carried out amongst created things, it is chiefly amongst insects that are destitute of wings (those comprised in the Linnæan order *Aptera*) that we meet with such as are most agile and dexterous in the use of their legs, which vary in number from eight to above a hundred.

¹ See Vignette.

Besides the above, which are seldom abroad except at evening or at early morn, there are to be seen throughout the summer and the livelong summer's day, hovering over flower-borders or flowery hedges, a scattered company of two-winged flies, which, as somewhat resembling, may be taken on a cursory view for *four-winged* bees. These are the *Syrphi*, whose prowess, while in their grub estate, as clearers of aphid-covered leaves—those especially of the rose-tree—we have celebrated in another place.¹ Contributing thus, through the carnivorous appetite of their growing youth, to the health and preservation of the plant, these aphidivorous flies, in their active and elegant maturity, heighten the beauty of the flower by adding to the number of its prettiest frequenters, as they now hover over the enamelled beds in suspension, seeming motionless, but maintained, in reality, by fast vibration of their pinions—then dart with rapidity to some other wing-poised station.

Few, perhaps, to look at the great burly body of a humble-bee when he is “tippling freely in a flower,” would suspect him of out-cutting, when on wing, all the other high-fliers, and swift-fliers, and far-fliers of his order (*Hymenoptera*), including, as it does, all other bees, wasps, ichneumons, and saw-flies. Yet such is his reputation in the field (of air), or in the sporting calendar of the naturalist; and while it outstrips its kind, the humble-bee (by no means humble in this particular) far exceeds, says Kirby, in proportion to its size, the flight of any bird.

It is said by a German naturalist,² in speaking of the emigrations of the feathered race, that birds require a wind which blows *against* them, such a contrary current helping to raise, and assist their flight. We are not aware, indeed, of any insect known to *require* this seemingly hindering help; but, however little one might think it, the comparatively fragile wings even of insects are often arrayed in battle against an opposing current.

¹ See article on Aphides, and Vignette.

² M. Brehm.

Not only can bees and some beetles pursue their flight in the wind's eye, but even butterflies have been seen, with their "sail-broad vans," making way against it. In power, swiftness, and grace of motion, "the painted populace" present, in different families, something of the variety which adorns their pinions; but when we look at these summer vagrants, idly flitting

"From bed to bed, from one to t'other border,"

we should hardly expect them ever to exemplify *permanence* as well as power of flight. We hear, however, not only of migrating birds, but also of migrating butterflies, of which some, not satisfied

"The woods, the rivers, and the meadows green,
With their air-cutting wings to measure wide,"

attempt, occasionally, to "measure ocean." For this purpose they sometimes assemble in gaily-bannered companies, and, in a straightforward continued course, press seaward and over sea, only, probably, to add in most cases to the number of those fair and fragile things which, strewed upon its surface, are for ever serving to augment the perishable "treasures of the deep."

But we need not follow insects over ocean, or even stir from off our chair, to see the surpassing power of their organs of flight; or, if we do not now see, we may remember, that the fly, now crawling so feebly up our window, was able, in the sunny heyday of her vigour, to sport above our heads at the rate of above thirty feet in a second, or more than the third of a mile in a minute—the third of the distance which a race-horse can achieve in the same period.

When, from the air, we glance downwards to the waters, we find the finny tribes in like manner equalled, and, size considered, exceeded in their motive powers by a variety of insect swimmers. Those which, in their perfect state, are wont to inhabit or frequently resort to ponds and ditches—such, for

instance, as aquatic beetles—are usually provided with a pair of hinder legs, long, strong, rather flattened, and densely fringed with hair, assisted by which they cut the fluid element in all directions, darting about, rising to the surface, or diving to the bottom with the utmost rapidity.

The above are among the principal of those insect movements which resemble the common motions, on land, in air, and in water, of other animals; but the latter exhibit some of a more peculiar character, wherewith insects also are endowed, besides others which would seem common to no other creatures but themselves.

The serpent, deriving a false consequence from its very sentence of degradation, is said to have partly owed its deification to the power, once looked on as miraculous, of crawling without legs. This attribute of once mysterious motion is shared by many insects, which in their state of larva are legless, but can glide onwards, and sometimes with rapidity, not pushed along like the serpent by the points of the ribs, but by alternate contraction and extension of the rings of the body.

The wonderful leaps of the salmon up cataracts (which these alone enable it to ascend), if, as has been stated, performed with tail in mouth, are imitated in manner as well as magnitude by an insect leaper, of which, as of the salmon, it may be descriptively affirmed that it is “at once both bow and arrow.” This little animal, which is the legless larva of a minute and pretty fly, and not, as is popularly supposed, a mere offspring of decay, is none other than the cheese-hopper, a very curious and admirably constructed creature, though to none, save to entomologists and certain epicures, an object of admiration. Swammerdam saw one of these legless leapers spring out of a box six inches deep, or twenty-four times the length of its own body. To compass leaps like this and others more stupendous, the saltatory performer erects itself on its tail, which is furnished with two projections that enable it to maintain its balance. It then bends itself into a circle, catches

a part near the tail with its hooked jaws, and, after strongly contracting itself from a circle into an oval, throws itself with a jerk into a straight line ; an action which effects the leap.

There is a certain fish,¹ which, when tired of swimming in its native element, is said to take the air by ascending trees. This climbing fish must be looked on, we should think, as a very *odd* fish among his finny fellows, on account of the strangeness of such proceeding ; but the oddest part of it, to us, must appear, while unexplained, the power of the legless swimmer to accomplish his restless or ambitious purpose. This is effected, it would seem, by help of his spiny fins and gill-covers.

Now a climbing chrysalis, as all must be ready to admit who know a chrysalis by sight, is a thing scarcely less wondrous seeming than a climbing fish ; and we find, in some instances, that the apparatus by which a chrysalis is assisted to climb, or raise itself upwards towards the surface, or from out the ground or other imbedding substance, is of a somewhat similar description to the spines of the above-mentioned tenant of the waters. To give an instance.—

The Goat-moth, whose works, as a carpenter caterpillar, in heart of oak or willow we have elsewhere noticed, has a chrysalis which, as well as some others, is furnished with a row of spiny serratures, extending nearly round each ring of its body. The use of these appendages become sufficiently apparent when opportunity offers (as it has done with ourselves) of watching the emergence of this case-bound creature from out the strong cell of cemented woody particles in which it is usually enclosed. A hard head, armed with points, having first enabled it to open, as with a battering-ram, a breach in the wooden walls of its prison, the swathed moth is then assisted by the purchase of its spiny case to draw itself more than half-way through the opening, wherein it remains tightly wedged, while the aurelian skin, bursting at the shoulders, gives egress to the winged form.

¹ *Perca scandens*.—Note in Sharon Turner's "Sacred History of the World."

Who would expect to find anywhere, save in the thinly-peopled world of monsters, a creature with legs upon its back? Yet have two such been discovered in the world of insects: one, the bat-louse,¹ which is described as being able to transport itself with marvellous celerity from one end to the other of the furry forest wherein it dwells; the other, the grub of a little gall-fly,² which inhabits one of the berry-shaped galls common upon oak-leaves. The latter can have, of course, but little room for exercise; but Réaumur, its discoverer, can hardly be mistaken in supposing that the singular position of its legs, in the centre of the back, is that of all others best adapted to its hollow *sphere* of action.

Some insects, again, are not only remarkable for the number of their legs, but also for the remarkable way in which they use them.

“When centipedes walk backwards, they only use their four hind legs, and these, when they walk in the usual way, are not employed, but dragged after them, like the locked wheel of a coach in driving down a hill. It was first observed, we believe, by Kirby, that a millipede, common under stones, the bark of trees, and the hollow stems of decaying plants, and provincially termed “Maggy Manyfeet,” performs its serpent-like motion by extending alternate portions of its numerous legs beyond the line of the body, while those in the intervals preserve a vertical direction.”³

The fly’s walk against gravity, that phenomenon by common observers so little noted, by careful ones so contradictorily explained, and imitated only by some others of the insect race, is sufficient of itself to confer upon that race a remarkable superiority over all others as walking animals.

Where, above all, shall we find walkers upon water? Nowhere, save in the ponds and pools and ditches and rivulets, whereon, almost daily, from spring to autumn, we may see

¹ *Nycteribia Hermannii*.

² *Cynips Quercus inferno*.

³ “Insect Transformations.”

gnats and *Tipulæ* lightly skimming, water-bugs gliding with or *against* the current, whirlwigs describing circles, and all performing their varied evolutions upon liquid plains with far more ease and dexterity than the most accomplished skater when those plains are rendered solid.

In air, as well as on land and water, various insects exhibit peculiar movements, as well as those shared with other winged creatures. The sportive dancing of gnats and Tipulidan flies, the sailing of winged ants, the beautiful undulating suspension of the graceful *Ephemera*, would appear to have no exact correspondence amongst feathered fliers; while of a character no less *sui generis* are various wing exercises of a non-progressive character performed by insects only. Of this latter description is the flirting by the butterfly of her painted fans, the fanning of bees, and the quivering of his little transparent, black-tipped pinions by the "vibrating fly,"¹ a tiny, scarlet-headed, black-bodied lover of the sunshine and of flowers.

The purposes of the above and similar actions may still, perhaps, admit of doubt, inasmuch as they have been assigned by careful and intelligent observers to different exciting motives. By some, the butterfly has been supposed to flirt her wings simply with the same cooling intent as that wherewith a lady flirts her fan, while another considers that the "Vanessa," when she fans the air with her pinions, is inviting its entrance into their tubes and nervures, as a preparative for flight; and while, by one, the quiverings of the vibrating fly are supposed to assist its respiration, another, from having noticed these same vibrations to be performed only in the sunshine, regards them as expressions merely of delight.

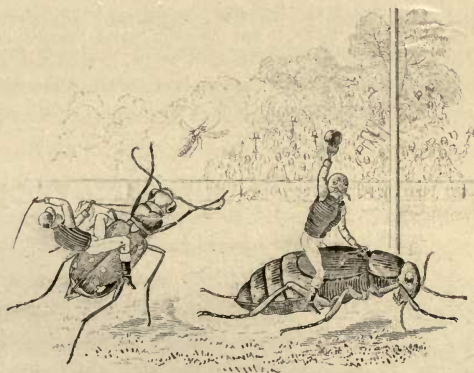
How can we so often permit our minds to stagnate for want of exercise, when even in an insect movement, and the springs which direct it, there is matter for thought, and doubt, and discovery!

Another peculiarity distinguishes the movements of some insects from those of nearly all other animals save man. This

¹ *Scioptera vibrans*, Kirby. See Vignette.

is their power, in some instances, of constructing and availing themselves of what may be called artificial helps. Such are the aerial bridges of silken thread, and the balloons of fluke, by which aeronautic spiders cross a void or ascend to the clouds. Such the silken ropes, descending or mounting by whose aid a variety of caterpillars, especially the Loopers, are enabled to break their falls from, or resume their positions upon, elevated stations; and also of this description are the rope-ladders, spun of the same material and employed by the devouring crawler of the cabbage to scale a garden wall, or, if we please to test her ingenuity at efforts for escape, the smooth perpendicular of an imprisoning glass.

The above, and all other insect movements, are, of course, to be observed at various times and seasons; but the subject of animal motion harmonizes with this present month of November, as well as with the two which have gone before it, for to all three appertain strong features of external movement preceding and preparatory to the external fixedness of winter.



In the swift Tiger and creeping Vil Beetles
see the fabled Hare and Tortoise. 25



All the insects of this group, excepting one, consist of Plant Bugs (*Pentatomidæ*, *Capsidæ*, &c.) of varied form and colour. The dark, long-bodied insect creeping up the pailings, is the *Reduvius personatus*, a bug itself, but an enemy, especially in its stage of larva, to our domestic horror *Cimex lectularius*. The Plant Bug, on a branch of Southern-wood below, is remarkable for a pair of singularly-shaped antennæ, and its wings (not shown in the figure) are of a beautiful violet-blue: the general colour of the insect is a dark olive.

FOR THOSE WHO ARE NOT OVER-NICE.

“With ho! such *bugs* and goblins in my life.”



NOW that insects abroad are become comparatively few, it may be as well to notice several of the race which are much too intimately connected with *home* to be entirely overlooked, though not certainly the most pleasing objects of contemplation.

To begin with the beginning—the origin of insect vermin. There is given by a certain traveller¹ the following curious tradition, as preserved amongst a sect of Kurds who dwelt at the foot of Mount Sindshar:—

“When Noah’s ark sprang a leak by striking against a rock in the vicinity of Mount Sindshar, and Noah despaired altogether of safety, the serpent promised to help him out of his mishap, if he would engage to feed him upon human flesh after the deluge had subsided. Noah pledged himself to do so; and the serpent, coiling himself up, drove his body into the fracture and stopped the leak. When the pluvius element was appeased, and all were making their way out of the ark, the serpent insisted upon the fulfilment of the pledge he had received; but Noah, by Gabriel’s advice, committed the serpent to the flames, and, scattering its ashes in the air, there arose out of them flies, fleas, lice, bugs, and all such sorts of vermin as prey upon human blood; and in this manner was Noah’s pledge redeemed.”²

According to the above tradition, human flesh alone would have been heir to the debt for which, in his dire extremity, the venerable Noah was induced to give a bond; but as all beasts, birds, and creeping things, were sharers in the preservation wrought by the cunning stopper of their leaky vessel, it is but fair that they also should pay a part of the tribute prospectively exacted. At all events, we find that throughout each order of animated being, from man down to the meanest insect, there is scarcely one exempt from some tormenting infestor which lives upon its vital juices. Scarce anybody who has ever noticed at all either a common black beetle or a humble-bee, can have failed to observe the shining mail of the one and the downy doublet of the other covered with a living load of small white or brownish insects, from whose attacks they are some-

¹ Eulia, quoted in the “Mirror.”

² There is also a Hindu tradition, in which the serpent, instead of *saving*, is represented as trying to wreck the Ark.

times brought to a deplorable condition. These are mites, or Acari, attached especially to bees and beetles; but butterflies, crickets, ants, and even the formidable dragon-fly, are all subject to the attacks of allied species, independent of other life-consuming enemies.

Those little *maudites bêtes*, termed, facetiously, by a popular author, "game from the capital pastures," find a favourite cover and preserve amongst the feathers of the bird creation, which, in its numerous varieties, is a prey to insect infestors of this description almost as varied.

The peacock, strutting in his gorgeous panoply of plumes, has, in common with others who are fretting daily under "splendid misery," a "thorn in the flesh," such as the most of his admirers little reckon of, in the shape of a tormentor peculiar to himself (the peacock louse¹), peculiar also for its own very remarkable exterior.

Poll Parrot or Mistress Cockatoo, when bending her head to invite our caressing fingers, has, ten to one, a less refined motive in the act than a mere love of notice. Even our little pet canary cannot always boast exemption from the "rufflers" of his race. He is sometimes seen to pluck and plume inordinately, without the usual incentive of a change of feathers. Now we must not attribute this to mere vanity, nor suppose that he is only smoothing his yellow satin doublet for some imaginary "at home," since it is quite as probable that certain unwelcome visitors, in the form of little red mites, are making themselves "at home" in reality under the unwilling shelter of his wing. This, however, with a real pet bird—one, that is to say, kept with cleanliness—is a rare if not unknown occurrence, for the above tormentor of imprisoned warblers is chiefly found in dirty or neglected cages. On this account it needs especial care never to introduce a feathered favourite into an abode which has been pre-occupied, without subjecting it, first, to proper ablution and fumigation.

¹ *Ricinus Pavonis.*

Ascending to quadrupeds, it is needless to whisper in ears polite the name of that exciting cause, or causes, under which our "Marlboroughs" are apt to forget their high breeding, and our "King Charles's" to encroach on their parlour prerogatives.

Grimalkin, with her own nine lives, has been said by Linnæus to possess a happy immunity from the burthen of carrying other lives about her; but we are more inclined to believe, with less distinguished naturalists, that while Puss is imbibing the yet warm juices of a mouse, a hungry flea may be similarly employed in sucking up her own.

We come now to the insect preyers on lordly man, of whom the lordliest, the kings and potentates of earth, have furnished some striking and most horrible examples of how the meanest and most despicable of earth's denizens have been employed by the Almighty Hand to lower the pride and reprove the cruelty of tyrants and oppressors.

Antiochus Epiphanes, Sylla, the two Herods, and the second Philip of Spain, the great persecutor of the Protestants, are all recorded to have been frightfully distinguished in their deaths as in their lives, by falling victims to the pedicular disease.

Various instances are related of another disease, somewhat resembling, though not similar, in which mites or Acari, lodge beneath the skin. One of these we shall briefly repeat, though often quoted, from Mouffet's "Theatre of Insects," because a *natural* cause is assigned for the infestation there described, such as would seem wanting in the cases of those tormentors tormented, on whom the finger of God was supposed to have been *supernaturally* laid.

Of "the Lady Penruddocke" our narrator tells us, that Acari, or mites, swarmed in every part of her body, head, eyes, nose, lips, gums, and soles of her feet, tormenting her day and night, till, in spite of every remedy, all the flesh of her body was consumed, and death relieved her.

Mouffet supposes that the insects were generated by drinking too copiously of goat's milk; a cause seemingly not improbable, from a species of this insect¹ being sometimes found in milk.

As connected with kings and rulers, we must advert to the tributary lice of the ancient kings of Mexico and incas of Peru, of whom it has been related, that they found no other means of ridding their subjects of these infestors, save by the animal imposition of a tribute to consist of a certain quantum of the living "*specie*." Bags full of them were found by Cortez in the palace of Montezuma and in the magazines of King Axajacatil.

Torquemada and other historians assign, however, to this strange *poll-tax* a motive very different to the above. It was imposed, say they, only on beggars, because Montezuma, who could not suffer idleness in any of his subjects, was determined that even those wretched people who would not labour should be thus employed.

Reader,—have thy midnight slumbers ever been disturbed by ghost or goblin? Unless thou art of the few whose "visionary eyes" have been opened, thou wilt most likely respond in the negative; and yet thou must have been favoured almost above the common lot, if a "fearful shape," whose name bears the same alarming import, has never "in dead of night" stalked up and down thy curtains, and with intent far more bloody than ever midnight spectre was known or supposed to entertain. Let us change the question: Have you ever been alarmed, or worse, by that familiar of London, Paris, Madrid, or Lisbon, yclept, in English parlance, a *bug*? If so, you *have* been visited by goblin,—for ghost or goblin does *bug*, in Celtic, signify. Nor, till in times comparatively recent, has that six-legged "terror," which creepeth by night, been thus appellated.

Of the common root of *bug* and *bugbear* a curious proof is

¹ *Acurus lactis*.

noticed in the "Insect Miscellanies," namely, that in Matthew's Bible, the fifth verse of the 91st Psalm is rendered—"Thou shalt not nede be afraide of any *bugs* by night;" and in this same sense the word must have been put by Shakespeare into the mouth of the Prince of Denmark:—

"With ho! such bugs and goblins in my life."

Before we leave their favourite locality, the bed of down which they convert into a bed of nettles, let's see what is this moving object¹ on the floor, by the bedside. 'Tis nothing but a bit of rubbish, a token of the housemaid's negligence, a mingled piece conglomerate of flue, and dust, and feathers, set in motion by the draught from underneath the door. Yet, no; never did wind create such careful motion;—and see! There is a leg—a living leg—and now another, protruded from the cloak of shreds and patches. Never did lame beggar hitch in his gait more piteously. Perhaps 'tis a great wounded spider caught in the remnants of his own snare. But whatever be the cripple, let's uncloak him.

Oh, the rogue!—impostor!—hypocrite! No sooner is he stripped of his disguise of dirt, than he takes to his heels as if the devil was behind him; but he shall not escape us; and now that he is fairly caught, let us carry him before the light for examination. And, truly, a more ill-looking miscreant, and ferocious withal, was never "pulled up" at Bow Street; his eye, especially, has murder in it, and murder, doubtless, was his design. What other could he have when lurking in disguise, like a cowardly assassin, beside a bed? He is self-condemned, let not the monster live. Yet the monster is but an insect after all; as such, shall we not spare him as beneath our anger? True; but ill-favoured as he is, our prisoner, in relation to ourselves, is innocent; nay, he is more,—he is, to us, a friend and benefactor in disguise; while of our enemy, the

¹ *Reduvius personatus*.

bug, although of the same kindred, he is also, in disguise, the deadly foe, destroyer, and devourer. It was in cunning pursuit of this, his darling prey, that we found him, under cover of his rubbish canopy, cautiously advancing, that he might spring, unheeded, on his victim; and for this reason, *Reduvius personatus*, thou masked bug-catcher, we release, and bid thee go and prosper. It is in its first form of *larva* that this wily *Reduvius*, or bug-catching bug, may occasionally be observed engaged as above described in its usual vocation. "The fierce look of this creature is then rendered," says Kirby, "more hateful by its *ocelli*, or simple eyes, having a pale iris round a dark pupil." Our figure¹ is that of the perfect insect, which is often to be found on palings in the month of May.

Before we take our leave of the extensive and ill-famed family of bug, we are bound to rescue it from that common species of injustice to which we owe the proverb of "Give a dog an ill name and hang him." For this purpose, leaving the pent-up precincts of the city for sweet fields and flower-gardens, we must introduce thee, Reader, to a numerous tribe, which, though bearing the odium of the same ugly patronymic, are by no means ugly creatures. On the contrary, and as if they borrowed variety and elegance of form, as well as brilliancy of colour, from the plants and blossoms they frequent, these plant-bugs are amongst the very prettiest of our English insects. In place of the loathsome wingless platitude of our domestic town torments, their "country cousins" are adorned, for the most part, with exquisitely delicate and iridescent wings, protected, when at rest, by membranous cases, which in various species present almost every variety of gay, as well as sober colouring. In short, with some general features of resemblance, these respective denizens of light and darkness are as much contrasted with each other, as are the darkness and the light themselves.

¹ See Vignette.

Throughout the summer plant-bugs abound ; certain kinds of them usually frequenting certain plants. Several of similar form, but varied in colour, red, black, green, are almost always to be found upon the southern-wood. They are common also, the green especially, on umbelliferous flowers ; and there is a pretty brown species peculiar to the thistle, with four delicately mottled membranous wings. Though always vegetable frequenters, these insects are not, at least, always vegetable feeders ; their sharp beak-like suckers (something resembling those of aphides) being sometimes employed upon aphides themselves.

In magnitude, as well as brilliancy of colour, the tropic bugs, as well as tropic butterflies, confessedly excel our own ; but for the blue bug of China we have one scarcely less beautiful, the blue bug of England,¹ which flies in the July sunshine, or is found resting upon heath or trees.²

Now, for a word or two about that sanguinary little monster, the Flea, which, like other sanguinary monsters of a larger growth, has been, perhaps, of all insects the most distinguished.

Stands it not recorded in history how that an individual flea was once honoured by a cannon-shot from a female royal hand, that of the celebrated Queen Christian ? and is not the brass piece of Lilliputian ordnance used on that memorable occasion exhibited in proof thereof, perhaps, to this very day, in the capital of Sweden ?

Has not “a company” of fleas, for many years, attracted, by its unrivalled performances, the curious sight-seers of London ? Have they not there beheld a flea quadrille danced to the fiddles of a flea orchestra ? Have they not laughed at two pulician combatants, sword in hand, adjusting a point of

¹ *Pentatoma cærulea*.

² The flying bugs of Hindostan, resembling our own domestic species in shape, size, and scent, are described by Bishop Heber as coming out in nightly swarms from every bush, entering the windows and crowding round the candles.

honour? and (oh! the burlesque on human greatness!) have they not there seen a Napoleon mounted on a flea charger?

The flea, as compared with the generality of insects, is a long-liver, for the Italian, Bertolotti, speaks of having kept one for twenty-three months, when it died apparently of age, having grown gradually darker till it became nearly black. In the days of its prime, its herculean task was to track a man of war; as its strength declined, its task-master lightened that stupendous load to ten links of gold chain, and on growing yet weaker, the venerable prisoner was released even from this splendid misery; but then, alas! its leaps, from two hundred times the length of its own body, could not clear an inch, and at last it could scarcely crawl across its prison.

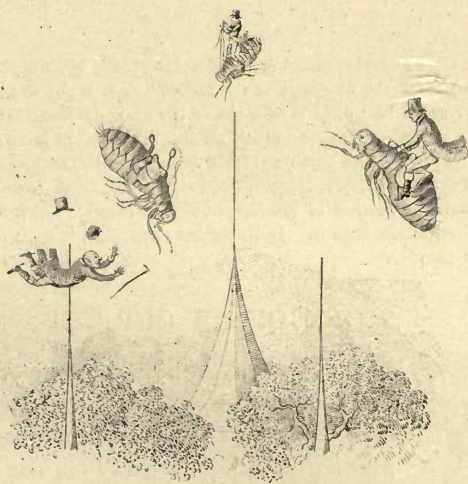
We all owe our consequence to some sort of *power*; and to the power of its muscles is the flea indebted for the best part of its celebrity. The extraordinary amount of muscular force, as displayed in its stupendous leaps, attracted very early the curious and observant; and Socrates measuring the leap of a flea figures in the "Clouds" of the satirical Aristophanes. And, in sooth, our agile little vaulter can take a leap worth measuring, for in reaching to the distance of two hundred times its own length, it is, in proportion to its size, as if a man should leap from three to four hundred yards.

This marvellous power must have first put it into the head of some ingenious person to display both his own mechanic skill and the flea's strength, by turning the latter into a little draught animal, in which capacity it has been proved capable of drawing three hundred and sixty times its own weight. Mouffet, writing in the reign of Elizabeth, mentions an English mechanic named Mark, who constructed a chain of gold as long as his finger, which with lock and key were dragged along by a single flea.

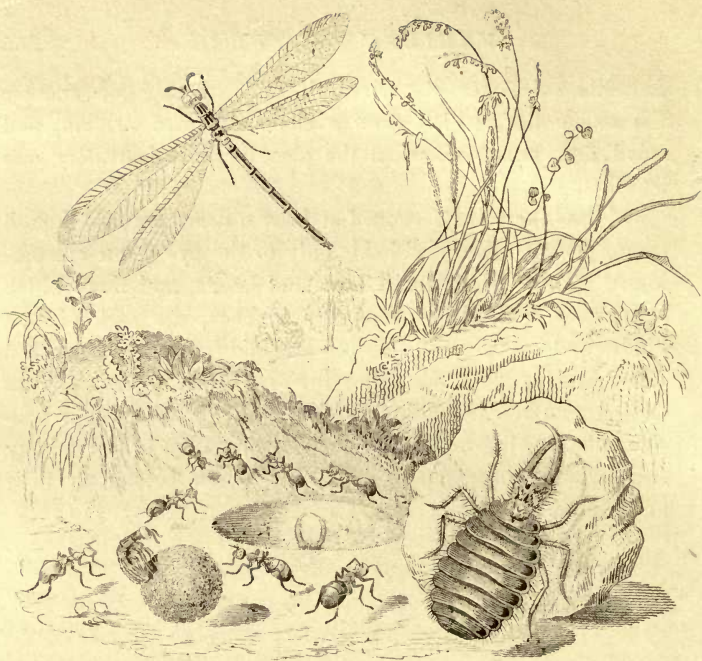
In Bingley's "Animal Biography" are related other the like instances of human ingenuity and insect prowess; and

Latreille celebrates the strength and courage of another Samsonian flea, which drew a silver mounted cannon, and stood fire, unmoved, when the piece of loaded artillery was let off.

Of fleas there are reckoned at least a dozen species, though some, perhaps, distinguishable only to the eye of an entomologist. Those which infest birds and beasts, and those which honour us with their peculiar preference, are each distinct kinds, and are probably therefore endowed with tastes too discriminating to abide long in, even if they emigrate to foreign quarters. Comfort herein for the delicately apprehensive, who, having no dogs of their own, are apt to feel fidgety and irritable in company of those which belong to their neighbours.



Sheds of metal and muscle for a steeple-chase in earnest.



The insect Ogre her represented is the fierce and wily grub of the Ant-lion (*Formica Leo*). On the fragment in the foreground it is shown in deformity unveiled, and more backward is seen one of the cleverly-constructed pitfalls in which it is accustomed to lie buried, all but its extended jaws, for the entrapment of its prey. The globular object towards the left is the *puparium*, or pupa-case, of this remarkable creature, itself remarkable for the smallness of its size, as compared with that of the *imago* (winged insect), which is shown in process of emergence from it. In its perfect expansion, it soars above—the Ant-lion Fly complete.

STORY OF AN OGRE.



VER a certain republic in the south of Europe there reigned, once upon a time, as cruel a tyrant as ever filled an absolute throne, or was ever hurled by his subjects from one of those cumbrous seats of a fashion now in course of explosion.

This tyrant was that shadowy potentate called Fear; and inasmuch as the people over whom he had usurped dominion were located in the midst of various gigantic enemies, and were exposed at all times to many overwhelming dangers, it might have been thought, though quite erroneously, that they could hardly ever be exempt from the same uneasy rule.

It was not, however, the fear of Death always at hand, under any one of his familiar shapes, that ever caused a moment's reflection, much less uneasiness, to a people so entirely occupied, as was that we are speaking of, in the business of life; but at the particular period of our relation, Danger, and Death behind him, began suddenly to trip up their heels in a manner so new and so mysterious, as to make the most heedless look very seriously about them, and hence only arose the panic Terror, which came for awhile to lord it over them.

The capital of their republic, which was built upon Italian soil, we shall call *Monticello*; and it was upon one of the principal thoroughfares communicating with this city, that the common enemy first began that unusual and ill-mannered mode of attack to which we have alluded. This highway had been traversed by many successive generations, to whom nothing had thereon befallen, excepting accidents of usual occurrence; but one day, as a party of some eight or ten individuals were quietly pursuing their way along what they supposed to be, as heretofore, a solid causeway, they came suddenly upon the edge of a deep and wide abyss.

Thus taken by surprise, two or three lost their footing, and rolled at once down the shelving side of this strange pitfall. The others might perhaps have maintained their equilibrium, but, blinded and overthrown by a shower of sand, rising from the hollow before them, as if from the crater of a volcano, they also, with exception of one who returned to tell the tale, were precipitated down the fatal descent.

The road whereon this alarming occurrence took place was speedily abandoned,—it was made, in fact, impassable; but in

whatever direction the stream of life was turned, there, with magic rapidity and in a mode quite inexplicable, yawning gulfs of a similar description were opened for its interruption.

It was customary, in the republican nation of which Monticello was the metropolis, to confide the care of all the infant population to public nurses, who were usually the best nurses in the world; but under the alarming visitation of which we are telling, even the care of these faithful guardians began to relax with their courage, and they would sometimes allow their charges as well as themselves to die nearly of starvation, for fear lest, in collecting food, they might become food in their own persons for the gaping pitfalls or their mysterious fabricators.

It was usual also in fine weather to carry the nurselings, for air and sunshine, beyond the city walls; but since the reign of the panic, they had been nearly all, as in time of siege, immured within their close apartments. But it had never so fared with the infant charges under the keeping of one youthful nurse, who, rather than they should lack anything, had continued to encounter all extraordinary as well as ordinary dangers, and that, hitherto, with the most perfect impunity. This kind and brave-hearted creature we shall call Piccoletta, because she was but a very little personage, and because, as before noticed, she and her compatriots were of Italian birth.

Well, this Piccoletta, who, according to her deserts, was a general favourite of the city, left it as usual one fine morning, in order to seek provision in the adjacent country; but night came and passed, and so did also the next day, without her re-appearance, and then every body thought she must have fallen a victim to their newly-besetting enemies; but on the second night, the sentinels on guard perceived in the moon-light a limping object approach the city, which, though magnified at first, by their ruling fear, into one of the dreaded trap-makers, they soon joyfully recognized as the missing Piccoletta. Nothing could exceed the delight of her neighbours at seeing her again, except, perhaps, their desire to know what had befallen her;

and when a little recovered from fatigue, and the injuries she had received in her expedition, she gratified their curiosity by the following relation :—

“You may remember, my dear friends,” said she, how I got up by sunrise the day before yesterday and went out by myself into the country. You know, too, that I never, on my own account, had any more fears about those terrible pitfalls, than if such things were still, as they used to be, quite unknown; but, somehow, on that morning, as soon as I got beyond the shadow of our city walls, my heart seemed to sink within me, and I should have returned directly, only was ashamed. Instead, however, of going on steadily as usual, I every now and then climbed to the top of some rock or eminence, to obtain an extensive view, and wherever I saw before me a dark roundish shadow, there I fancied a pitfall opened, and took a round-about way to avoid it. This tired me not a little, but I was determined to proceed as far as I had intended; that was, to the clump of elder-trees where some of our black cattle have been lately at pasture, and from whence I have often brought fresh supplies of honied milk.

“Judge, however, of my disappointment, when, after so much toil to reach them, I found the elders all cut down (by the hands, doubtless, of those two-legged giants who do more mischief in our beautiful world than all the other creatures put together), and nothing left of those useful animals I had come to seek, except a few trampled remains which it made my heart ache to look upon. It was too late to go further, but not bearing to return as I went, I resolved to take quite a new beat home, in hopes either of meeting with another herd of our milch-kine, or of finding some of that sweet vegetable food which serves us at once for milk and bread. I was intent, eyes and mind, on this search, and had forgot nearly all about the pitfalls, when all on a sudden, I found myself in the midst of the most delicious perfume—not of flowers only, but of the very thing I was seeking—and saw, to my delight, that I was

coming to a large oak-tree covered at the top with a woodbine in full blossom. I knew by the mingled scent, that the leaves, both of tree and creeper, must be covered with that precious manna which kind Providence rains for our support. I then began to ascend the tree, taking a winding course to make the ascent more easy, and resting often enough, I can tell you, before I could reach the first leafy cluster of oak and woodbine intermixed. Then I had a delicious rest, and a delicious meal indeed, after which, I took care to load myself with as much as I could possibly carry of the abundant store around me.

"I meant to descend as soon as I had done so, but what with walking and climbing, I was too weary to move, and, after such a plentiful meal, began to feel drowsy. The heat of the day and the warm scent of the manna and flowers made me grow more and more heavy, till at last I fell fast asleep.

"How long my nap lasted I cannot tell, but I was first aroused by the sensation of falling, and then entirely awoke in terrible earnest, by coming in violent contact with a something so hard that I seemed almost knocked to atoms. As soon as I recovered a little from this tremendous shock, I looked about me, and where do you think I found myself but in one of those frightful pitfalls I had been, on setting out, so careful to avoid?

"On what was below me I dared not for some time to cast an eye; but when I did,—oh! I thought I should have died with terror!—for what should I see at the bottom of the pit but a hideous Ogre, with a pair of horrible pointed tusks, longer than his own head or any of our bodies, and all besmeared with the blood of some unhappy creature like ourselves, which he seemed at that moment drinking in, just as our cattle draw in the sap of the elder and other trees.

"The Ogre was a long time occupied with his sickening repast, but at length he let fall the body on which he had been engaged, and rolled his great eyes all around the cavern. He was coming, I thought, to drag me down, but I suppose I escaped his notice, for he returned again to his last victim, as I

at first imagined, to devour it, but instead of that he only tossed it several times over, and at last, by a tremendous jerk, threw it out of his den. Then he lay down, and pushing and shoving his great body into the deep soft sand at bottom of the pit, buried himself entirely all but his horrible tusks, which remained sticking up above the surface. For a long while I watched in breathless terror for his next proceeding, but, as he continued quite motionless, I flattered myself that this was his way of going to sleep; and now or never, thought I, I must make a trial to escape. I examined the bank above my head, and seeing on its smooth surface a piece of projecting stone, set foot on the steep ascent with a view to grasp it, but on my first step a mass of dislodged sand fell rolling downwards. How I shuddered lest the Ogre should be roused! and so, in truth, he was—that is, if he had ever been asleep—for instantly rising to meet the stream of sand descending, came a volley of the same, thrown up, seemingly, by the tossing of the monster's broad flat head, as he still kept wallowing in his soft bed at bottom of the den. I was almost blinded, and thrown nearly off my station, but I contrived to keep it, and in a short time all was again clear and quiet, and nothing but those terrible tusks above the sand showed signs of a living thing in the cavern, except my poor trembling little self.

“If the Ogre's sleep was real, perhaps he had resumed it; but whether or not, I dared not again to set foot on the loose surface of my prison-wall, but kept crouching on my ledge of stone, till I grew as cold as it, and wished myself as senseless, that I might not hear, as every moment I expected, another stir below me, and feel myself being pelted down into the monster's clutches. But hours, seeming weeks, went on, and the Ogre remained still as death, till, as I supposed by the increased obscurity of the cavern, the sun had set. Then, suddenly, it grew darker still; I heard a distant roll of thunder, and there fell into the pitfall some great drops of rain. The monster at the bottom began to stir. Ah! thought I, it's all

over with me now ! and the dust which I felt again in motion assured me that my fate was at hand. I had scarcely power left to cling to my last holdfast, but cling I did, and presently became aware, from a terrific roaring of the branches of the oak above, that it was now a violent gust of wind, and not the movements of the Ogre, which disturbed the sand and was whirling it in eddies round the pit.

“ Then came a tremendous crash, and my sole support shook under me. ‘ Now,’ groaned I, ‘ I am lost indeed ! ’ but in that moment I was saved. Something falling from above had nearly shut out all remaining daylight from the mouth of the pitfall, which it lay across, and nearly covered. Here and there, however, I could catch a glimpse of light, and, when my terror was a little abated, discovered with infinite joy that the top of my hideous trap was nearly covered by a bough torn by the storm from the oak above. Grasping with eagerness this unlooked-for help, I speedily abandoned my dangerous station, and a moment afterwards heard the stone which had supported me rolling to the bottom of the pit.

“ Hope renewed my strength, and by turns climbing and traversing the branches of my saving arm of oak, I soon found myself again on solid ground, and, with the utmost speed I could put forth, made my way homewards across the sandy plain around the pitfall.”

The veil of mystery was now drawn in part from before the dreadful pitfalls ; but the death which lurked within them was not considered, by most of the listeners to Piccoletta's tale, as a whit the less formidable in the palpable shape it had now assumed. One old sage among them seemed, however, of a different opinion.

“ My counsel is, that a strong party should leave the city, and, closely encircling the first pitfall to be found, compel the wily occupant either to stay within and starve, or come out and fall an easy prey to our united force.”

A numerous party was assembled for the first expedition

against the Ogres, and, by her own particular desire, Piccoletta went with it.

Under her guidance, the troop marched first towards the pitfall whence she had escaped, not with any view of attacking the Ogre who had occupied, but who they believed to have been dislodged from it by the storm, but for the purpose of strengthening their bodies, if not their hearts, by a plentiful meal off the manna, or sweet bread, of the oak from which their little pioneer had fallen.

Having accomplished, without interruption, this desirable preliminary, they had not proceeded much farther before they came upon another excavation of which the ugly character, could they have doubted it, was pretty clearly evidenced by the appearance, near upon its verge, of several dead bodies, the cast-out remains of their fellow-citizens. Here they came to a halt, and formed a circle as close and as deep as their numbers would permit, around the mouth of the pit-fall, which had been constructed, as usual, in a sandy soil. Thus they remained, still as mice; and quiet as a mouse, too, remained the cat-like Ogre (if Ogre was there) at the bottom of his cavern, which, from the prudent distance of their position, his besiegers were unable to discern. Hour after hour passed, till from very inaction the courage of the surrounding party, which had arrived in tolerable spirits, began to flag. Declining daylight did not augment their valour; and, as surrounding objects grew indistinct, the passing of a moth or bat—even the rustle of a leaf—sent a tremor through the fearful circle. It would have been broken, likely enough, by desertion, under cover of darkness, but for dread of other pitfalls, or their makers, stalking about under the same nocturnal cloak. The night, however, ended without one alarm, except from phantom fears. Piccoletta was the first who suggested that, perhaps, after all, they were only surrounding an empty trap; and was the first also, when morning came, to creep softly and lightly towards its circumference, to ascertain how this might be. She seemed right in

her conjecture—no ogre was to be seen at bottom of the pit; but, where the monster usually made his lair, she perceived, as she thought, a round object, like a ball of sand.

Piccoletta was curious as well as courageous. She proposed to a comrade that, by the assistance of each other, they should descend to the bottom of the pitfall; and when the latter (as was not very surprising) looked somewhat shy of the attempt, our little heroine, half-stepping, half-sliding down the descent, effected her bold purpose by herself. Bold as she was, she nevertheless shook, for a minute, from top to toe, when she found herself standing alone in the very print-mark left by the monstrous body of the late tenant of the den.

But cause for alarm seemed none, as she evidently had the pit-fall entirely to herself, with nothing whatever near her except what looked below, as it had appeared from above, a great ball of sand—great, in comparison with Piccoletta, or with any of her companions, but very small, as compared with a creature like the Ogre. On the matter of her re-ascent Piccoletta felt no concern, being assured that it would prove the easiest operation in the world, when performed free of the monster's presence and his arresting volleys.

She began, therefore, with great composure, to examine the brown ball which had raised her curiosity, and, on feeling its surface, discovered, to her surprise, that, instead of being hard, it was soft and yielding to the touch. Meanwhile, the people above grew curious on *their* parts to see what was going on within the pitfall, and some of them, spite of their fears, drew closer to its edge, from which a few fragments, detached by their weight, fell crumbling downwards. Piccoletta looked up with a smile, partly of encouragement to her companions, partly, perhaps, of self-complacency at her own superior courage. At that moment, she heard a slight noise beside her. Turning round, she beheld the ball in heaving motion, and, presently, through a rent in its circumference, appeared—a living head. It was not the head of the Ogre; but to Picco-

letta, in her terror, it looked something like it, and she thought even that she saw the points of the horrible tusks she had once seen so hideously employed. Then all her courage deserted her, and she fell senseless to the ground.

The lookers-on above shrank backwards in dismay; and, as if they had beheld the Ogre himself striding up the sides of his den,—broke up their circle—huddled together in confusion—and rapidly retreated.

Presently, however, as if ashamed of their cowardice, they stood still, and again turned their faces towards the quarter of apprehended danger. Not a thing was visible on the smooth sandy plain around the mouth of the pitfall; nor, for awhile, above it; but then, rising suddenly from the centre of the hollow, a winged form shot upwards, like a sky-rocket. It approached, glittering in the morning sun, then hovered high above the wondering and admiring crowd. “A genius! a genius!” they exclaimed; “a good genius, who has killed the Ogre, and saved us from destruction!”

Even as they spoke, the brilliant apparition descended slowly from its aërian height, and, on four resplendent wings of immense expansion, again hung suspended now close above their heads. But not long did it thus hover—its brooding was as that of a kite over a flock of doves,—and presently, kite-like, it siezed its victim, lifting it from amidst the deluded multitude by help of sharp talons and a pair of crooked tusks, terrible as those of the dreaded Ogre.

Their former fears swallowed up by this new alarm, the discomfited force of Monticello hastened in confusion towards their city; but, before they reached it, one more of their number was carried off by the same winged assailant, or another resembling it, and rising, in like manner, from another of the ogre pitfalls.

What had become, meanwhile, of Piccoletta? This was an inquiry which, after they were safe within the walls of their capital, suggested itself for the first time to those who had left

her in the lurch. When, however, they had time to think of it, they felt shame enough, as they well might, at their base desertion, to control even their new fears of their new enemy, in defiance of whom a small party speedily retraced their steps, and reached, without interruption, the pitfall round which they had been stationed. But there was no Piccoletta to be found, and not a thing was visible at bottom of the excavation; not even the wonderful ball, from whose heaving throes and living outbirth they had recoiled in terror, before the ascent of the winged form, which, instead of a *good*, they now looked on, and with pretty sufficient reason, as an *evil* genius. An hour or two's fruitless search ended in the persuasion that Piccoletta was lost for ever; and, sorrowful for the loss of their little townsfellow, and crest-fallen at the cowardice to which, perhaps, it was owing, the party turned again towards home.

The summer sun had now attained its height, and the baffled Monticellians were toiling onward under its scorching beams, their dread of pitfalls, ogres, and genii, all nearly overpowered by vexation and fatigue, when suddenly their path was overshadowed; a flapping of heavy wings was heard above their heads, and at the same moment there fell amongst them a—something—from the stroke of which several individuals fell prostrate. The others hastily recoiled; and in the space thus cleared, there appeared in the now sunny road (for the shade had passed away with the onward flight of the object which had caused it) the miraculous ball which they had seen last within the pitfall. It exhibited, as then, a rent in the side, and was now, moreover, somewhat crushed and battered.

So fearfully connected was that ball of wonder with the den of the Ogre, and with the apparition of the cruel winged genius, that not one of the gazers dared approach, much less touch it; and, on beholding it again in motion, all drew back, as before, in consternation.

A voice was heard,—it proceeded from the interior of the ball,—and, strangely as it sounded, there was something in its

tone familiar to those who heard it. Could it be the voice of her they had been seeking? It was none other; and alarm was all forgotten in joyful surprise when, peeping through the rent in the misshapen sphere, they saw the little head of Piccoletta. Without waiting to inquire how she had got into that world of wonder, or how she had fallen in, with it, amongst her friends, some of the latter lifted her, ball and all, upon their shoulders, and carried her, rejoicingly, to the city.

The history of her second escape was soon told. When she awoke from her sleep of terror, on the bed of sand in the pitfall where her friends had left her with so little ceremony, she looked first at the ball whose issuing tenant had so sorely frightened her; but, through the yawning rent in its side, saw, or thought she saw, that it was now empty. Then she looked at the sandy walls, which rose sloping round her, and, seeing all clear, lost no time in beginning to scale them. This, though a very laborious, she found (as she had expected) no impracticable task, and had half achieved it, when she heard in a tree at hand, the well-known knocking of the great Pecchio.¹ *This* time, from her precarious position, it made her heart sink, and, what was worse, caused her foot to slip, so that she fell rolling with a stream of sand to the bottom of the pit. The Pecchio heard and saw her, and, darting from his station on the trunk of an elm, lighted on the edge of the cavity, devouring her with his great eyes, and ready to swallow her down his great throat. There was only one place of refuge open for the trembling Piccoletta, and that was the ball beside her, into which, in her desperate strait, she was right glad to creep. But the Pecchio was not to be so easily baulked of his coveted morsel. He dipped his enormous red head into the pitfall, seized both the ball and its shaking occupant, rose with them into the air, and dropped them, by good luck for Piccoletta, in the midst of her acquaintance.

This was an explanation, simple enough, of Piccoletta's

¹ *Pecchio*—Italian for Woodpecker.

entrance into, and her exit from, the wonderful ball; but its chief mysteries were still unravelled. Who could tell what that ball had to do with the Ogre and his pitfall?—how it first came there?—how a winged shape, with pinions of expansion many times wider than itself, could have issued, apparently, from the globe? and how the Ogre's remains were found in its interior?

Not, certainly, the citizens of Monticello, to whom all these things were as the work of a magician.

A pantomime with its machinery exposed would be a sorry spectacle, stripped at once of its amusing and surprising character; but there are certain pantomimic incidents of which the theatre is the insect world, and in which the part of harlequin is played by Nature, that cannot be thus marred, for the more they are elucidated the more do they raise our admiration. Of this description are the marvels which compose the history of the "*Formica Leo*," "*Ant-lion*," or *Ogre of Ants*, on which our "*Tale of an Ogre*" has its foundation.

The *Ant-lion* is not a frequenter, now-a-days, of Britain; not exactly, therefore, a subject for our exhibition; but it has a place in British catalogues, and having, as it would thence appear, been found once, it may still have lurking-places in our island. This conjecture is considered the more probable from its being a native of central France and Switzerland as well as more southern Europe. At all events, it is sufficiently rare in this country to constitute a "*Lion*" indeed among English insects, and, as such, better worth the seeking. The wily and cruel grub of the *Ant-lion*¹ (the *Ogre* of the pitfall) is a grey-coloured ring-bodied insect, in form not very dissimilar to a woodlouse, only much larger, and with six, instead of many legs; but its most conspicuous distinction consists in a pair of tremendous jaws, each pointed and curved like a sickle, and forming together a forceps-like weapon, wherewith, being tubular, it can at once seize, pierce, and suck the blood, or,

¹ See *Vignette*.

more properly, the acid juice of the ants it preys on. The snare or pitfall of the ant-lion consists of a funnel-shaped excavation, scooped out of sand, in size varied, but most often of about three inches diameter by two deep. In the bottom of this den the cunning creature awaits its prey ; and, not content with the screen afforded by its encircling walls of sand, is accustomed to conceal its whole body within a deep bed of the same material, leaving only its formidable jaws above the surface. When an unfortunate ant happens, by treading too near this terrible trap, to dislodge from its edge a few particles of sand, these in rolling to the bottom apprise the lurker of its victim's proximity. Then, forthwith, more active measures are adopted to ensure the latter's downfall, its concealed enemy beginning to toss up, by repeated jerkings of its head, successive showers of sand, whereby the busy little traveller is sure, almost, to be precipitated into the pit and jaws of its wily destroyer. When its juices are all extracted, the carcase of the victimized insect is thrown out of the murderer's den.



Globe and all then lift her on their shoulders



The insects assembled in this Vignette afford only average specimens of Nature's decorative skill, but serve to illustrate the three modes above mentioned of insect adornment. In the Moth Caterpillar, with its goldfinch colours (scarlet, yellow, black, white, and brown), resting on a branch of elm, we have an example of gay painting wanting permanence. This latter quality is supplied in the Ruby-tailed Wasp (*Chrysis ignita*) on the paling. Above, are two larvæ (pseudo-caterpillars) of the Currant Saw-fly (*Nematus Ribes*), their skins of greenish yellow, studded with raised dots of shining black. On the nettle-stalk adjacent hangs the gilded chrysalis of a Tortoiseshell Butterfly (*Vanessa Urticæ*); and above, flying upwards, its superior wings laden with seeming gold, is one of the little Moths (*Tineidæ*) come of caterpillars which feed on the bark of Birch-trees. Also inscribed in mimic gold is the Greek γ , which gives name to the larger Moth (*Plusia gamma*), seen on wing beneath the flower-head of Knapweed (*Phrygia nigra*), seated on which, her closed pinions "freaked" on their reverse, not with gold, but silver, is a brown Fritillary (*Argynnis Adippe*). The only specimen of insect Carving for which room has been here found is one of the sculptured eggs of the γ Moth on a leaf of Knapweed.

PAINTING, CARVING, AND GILDING.



THE Temple of Nature is no plain puritanic place of worship. It is rather the model of a gorgeous cathedral, and, like a sacred edifice of the latter description, it stands distinguished by a profusion of adornment worthy of the mighty fabric.

Flowing draperies of foliage, hung on high as curtains or as banners—floors tessellated with flowery mosaic, or bespread with verdant velvet—massive pillars and slender shafts marbled with painted lichen and entwined by graceful creepers—all these combine, while they immeasurably eclipse the beauty, to attest the origin of Gothic art.

As with this glorious fane, so it is with the worshippers of every degree which are found assembled beneath its aerial canopy. Beauty and variety are the prevailing characteristics of living things; and if in dignity and grace of form man and a few of the larger animals must be confessed pre-eminent, we find in diversity of shape and brilliancy of colouring a striking augmentation as we descend, relatively to size, in the scale of created beings.

Amongst the most beautifully painted of the caterpillar race are those from which spring the elegant and distinguished tribe of Hawk-moths, known also as *Sphinxes*, from the form and attitudes, elsewhere described, of these their no less distinguished larvæ. None, perhaps, among them, are more tastefully decorated than that of the “privet,”¹ with his doublet of the most brilliant apple-green laced by oblique stripes of white and purple, further adorned along the sides by orange-circled spiracles or

¹ *Sphinx Ligustri*. See Vignette to “A Midsummer Day’s Dream.”

breathing-holes, and finished at the nether extremity by a black and yellow horn.

Little inferior as respects colour is the garb of the Privet's cousin of the lime-tree.¹ His surtout also is of green, subdued towards the sides, but on the back so vivid as to dim by comparison the brightness of the newest leaves which open round him. His pervading hue is usually variegated on each side by seven oblique stripes of yellowish-white and crimson, his small mitre-shaped head is edged with white, and his six claws are tinged, like the tips of Aurora's fingers, with rosy red. His horn, or tail, is bright blue, and the whole surface of his body is dotted with regular rows of small tubercles, giving to the skin the appearance of shagreen.

More common specimens of showy caterpillars are the growth of every garden. Most common of all, the speckled feeders on the cabbage, the striped "lacqueys," and the black and yellow spotted "magpies," which commit their leaf larcenies on the gooseberry and currant. Apropos of spotted caterpillars and gooseberry and currant bushes, we may notice that, frequently besetting the latter, and reducing their leaves to perfect skeletons, are certain other black-spotted varlets, which we mention here for the sake of noticing that their spots, or dots, which are very shining, are raised above the surface of their greenish-yellow skins, forming thus another sort of shagreen to that which clothes some of the Sphinxes. This ornamental apparel they are accustomed, on their last moult, to exchange for a plain one, "as people," says Réaumur, "when they advance in years, become usually more simple in their dress than when they were young."

There are few specimens of the flower-like or water-colour painting, if we may so call it, which we are now reviewing, that display more vivid tints, or more elegantly-pencilled patterns, than are sometimes to be found on the bodies of

¹ *Smerinthus Tiliae*. See Vignette to "Insect Movements."

spiders, such of them as are frequenters of the garden and the field. The ungraceful forms of those among the same tribe which are accustomed to abide in dark places are clothed in skins of corresponding dulness ; but those which live and lurk amongst leaves and flowers seem to have stolen of their lively colours. Green, green and white, red and yellow, red and white, or varied browns, in regular and tasteful markings, adorn most commonly a variety of these spinners in the sunshine or the leafy shade.

Amongst the less gay, but not least remarkably-painted of this wily race, we cannot overpass that notable hunter, striped (in black and white) like a zebra, and leaping like a tiger, which is sure in the early sunshine of the year to be seen basking upon walls and window-ledges, ready to pounce upon the first unlucky fly tempted to the same spot by the same enlivening and unwonted warmth.¹ As one of the harbingers of summer, we always look a welcome on this saltatory lover of the sun, or perhaps only of the prey the sun procures him ; and, for the same reason, we first espy with equal gladness his highly distinguished or distinguishable little cousin, the scarlet Satin Mite,² whose showy doublet loses nothing by contrast with the ground he traverses.

On the order *Neuroptera*, including dragon, scorpion, and lacewing flies, the pencil of Nature has laid some of her most brilliant colours, wanting only breadth to attract more general attention. The linear trunks of dragon-flies are variegated, according to their species, with yellow, blue, green, and red, each accompanied more or less with black, and exhibit in the peculiar clearness and sharpness of their mode of inlay the appearance more of mosaic than of surface painting.

But it is not either our province, or our purpose, or desire, to wander far, even descriptively, from home ; and it is time

¹ See Vignette to "Spiders in their Analogies."

² *Trombidium holosericum*.

now to end our brief and most imperfect notices of insect painting, chiefly of the British School, by a word or two on the most admired and most permanent of all Nature's performances in this department of her grand *atelier*—the colouring, namely, of butter-flies and beetles. But of this, in truth, especially as concerns butterflies and moths, we have little left to say. For the few individual descriptions we have found space to afford them we must refer our readers to preceding pages and pictures; and as a general observation on their mode of decoration, we have noticed, we believe, that the painting on the wings of *Lepidoptera* is executed in mosaic, the scales or plumelets of which it is composed being laid upon, or, more properly, inserted through, minute holes in the transparent membrane of the pinion. No niggard of her colours, Nature on these overspreads both sides of her delicate canvas. Some, indeed, among our butterflies are able to display on the reverse of their glorious pinions, as they "ope and close them," a greater show of pattern than that which adorns their upper surface. Of this description are the standards of the "Red Admiral,"¹ for in these we hardly can decide which are the most "admirable," the rich and glowing masses of the upper, or the varied and elegant shadings and pencillings of the lower side: the same may be observed of the robes of the "Painted Lady"² and their linings. In many also of our genus *Polyommatus*, the cerulean blue opened in expansion towards the sky it emulates is hardly more beautiful than that warmer grey beset with mimic eyes, seeming, when the wing is erected, to look on the lowlier things of earth.

But we must have done with enamelled and metallic painting, or where shall we find space to notice, finally, another species of decoration, which confers on certain among insect forms an apparent relation yet closer with the mineral kingdom,—that semblance, we mean, of gilding, which they not unfrequently

¹ *Vanessa Atalanta*; also "Admirable." ² *Cynthia Cardui*. See Vignette.

exhibit in common only, we believe, with some of the most highly decorated of fishes ¹ and of serpents? ²

From its appearing most frequently on the enclosing cases of butterflies when in their pupa forms, these have obtained, with the pupæ of moths also, the name of Chrysalides and Aureliæ. This gilding is easily to be observed in August among the chrysalides of the small tortoiseshell butterfly (*Vanessa Urticæ*), which are often to be found suspended, head downwards, on the nettle-stalks they have stripped, or on some convenient wall or pale adjacent.³ The aurelia of the "Painted Lady"⁴ is another which well deserves its name for the gold-like streaks and speckles which variegate its clouded surface.

¹ As the Gold and Silver, the John-Dorey, the Gilt-head, the *Scomber auratus*, &c.

² As the *Coluber Atraculus*, resplendent in scales of burnished gold, &c.

³ See Vignette.

⁴ *Cynthia Cardui*.



You shame our trumpery daubing!



The two spiders on the top of the wall are of the tribe called "Hunters," as opposed to "Sedentaries," or such as construct snares and sit within or beside them. That on the right, with zebra-like stripes, is the *Salticus scenicus*; opposite, is a nearly resembling species; and climbing the Wall-flower, is a beautifully-coloured geometric Web-Weaver.

SPIDERS IN THEIR ANALOGIES WITH OTHER ORDERS OF CREATION.

WE have had occasion to notice already a variety of correspondencies observable between insects and the higher, or larger, orders of animated creation. In the gentle, as well as predaceous tribes, this resemblance is traceable; but with reference especially to habits of destructiveness, the Spider alone, in its different species, affords the most striking parallel and prototype of all destructive beings, from man him-

self (we might even say, from the infernal spirit) through the descending grades of quadruped, bird, reptile, animal, flower, even to the vegetable of fly-catching construction. Hidden from view behind the gauzy screen afforded by her horizontal net, how does the domestic spinner sit grimly on her cunning watch for the least vibration in her lines, those single threads so artfully extended above the main web for a triple purpose—to arrest the flight of her victims, by its tremblings to announce their capture, and as a cable-bridge to enable her to reach and seize her prey.

Besides thus with crafty wiliness seeming to plan and certainly compassing the destruction of others, the spider, by apparent stratagem, often assumes the appearance of death as a means for the preservation of her own life. Who has not often noticed how that, on alarm or pressing emergency, she will sometimes, instead of taking at once to her hairy shanks, only fold them up under her, and, dropping from her station, remain without motion, even (according to experimental naturalists) to the piercing and tearing asunder of her soft bloated body?

Again, it has been said and sung, that even the wild beasts spare their kind, the destroyer Man alone turning “his fierce pursuit on man.” This is not true, the assertion being contradicted by several carnivorous creatures, both of land and water; but the spider follows pre-eminently in the path of the principal and earliest fratricide, by the habit of killing, and, in cannibal-fashion, devouring its comrades, even of the same family. Réaumur attempted to establish a factory of the large garden spiders, for the sake of their strong and beautiful silk; but the factious weavers overturned his “*projet*” by turning their fangs upon each other. If it were an agreeable object of discovery, we might seek and find yet a few more corresponding points of character betwixt ourselves and the “villain spider;” and what is singular, such resembling features are the most apparent in those species of the race which are greatest frequenters of

the human habitation and its neighbourhood,—in those which

* “*Spread their nets*, whether they be
In poet’s tower, cellar, barn, or tree,”—

and which, comprising the spinners of house and garden, are of a class called *Sedentaries*, in distinction to the “*Vagrants*” and “*Hunters*,” which, using no net, either lie in ambuscade, or roam about, seeking what they may devour.

Now, as the “*Sedentaries*” are best representatives of preying men, so these latter, the “*Vagrants*” and the “*Hunters*,” are the nearer prototypes of preying beasts. And first, the “*Vagrants*,” cunning also in their cruelty, bear, perhaps, greatest resemblance to the feline races, springing, like the tiger from his lair, upon their unsuspecting prey. Of these, one¹ forms or finds its ambush in a rolled-up leaf; another² lurks behind a stone or the gaping bark of an old tree; a third³ (as a tiger in his jungle) sits embowered in the thick panicle of a reed; while a fourth, ensconced, as at bottom of a pit, in the calyx of a dead flower, sits prepared to pounce upon the first unwary fly happening to visit it in search of honey.

If the more wary roamers of the forest and the desert have thus their insect images amongst spider “*Vagrants*,” the more daring have resemblances as apt in the bolder “*Hunters*,” such as spring openly on their prey, and, after destroying, carry it for devourment to their dens. On a flowering shrub sits an enormous hairy-leg of this description, on the look-out, we may be sure, for game:—perhaps a swollen blue-bottle, a fat drone bee, or an overgrown crane-fly? No; he aims, or we may almost say he flies, at a higher quarry—at a living prey, lustrous as a gem, swift as the lightning; as it darts from flower to flower, too rapid on the wing for human sight to follow, yet not so rapid as to elude the eight-eyed vision of the monster which has marked it for destruction—not so rapid as to outstrip his eight-legged spring, or to escape the eight terrible

¹ *Clubiona holosericeum*.

C. atrox.

³ *Aranea arundinacea*.

claws which will soon engrasp the feathered honey-sipper, and bear it from its sunny joys to be devoured in a den of darkness.

The "Hunter" here is the gigantic "Bird Spider"¹ of South America; its prey, which it equals in dimensions, one of the glittering, quick-winged humming-birds which often, it is said, fall victims to this insect enemy, for bulk and fierceness the lion of its tribe.

Compared with the above, our little native tiger of the same race² may seem a tame and insignificant destroyer; but not so, we warrant, to its insect prey. This is of that pretty, common species, banded, like the zebra, with stripes of black and white. Everybody must have seen them upon sunny walls, and window-seats, and palings (their scorching deserts) from spring to autumn, though not many, perhaps, have derived as much "divertissement" as the "Sylvan" Evelyn from observation of the cunning dexterity with which they watch, then leap upon their prey; when he noticed of these, or of some allied *venatores*, how that one of them, if it "happened not to be within a competent leap, would move so softly as the very shadow of the gnomon seemed not to be more imperceptible, unless the fly moved, and then would the spider move also in the same proportion, keeping that just time with her motion, as if the same soul had animated both those little bodies."³ These "Hunters," at least some of them, though they do not weave *snares*, can weave *nests*, usually a close tissue, within crannies and crevices, their common lurking-places.

The Wolf Spider⁴ is another of the "Hunters," which, seizing its prey openly, bears it to its den, a cavity beneath a stone. This carnivorous prowler, which is of a dark greenish-grey, haunts the borders of ponds and streams, and, as well as diving under, can walk on the surface of, the water; and another⁵

¹ *Mygale avicularia*.

² *Salticus scenicus*. See Vignette.

³ Evelyn's "Travels in India."

⁴ *Lycosa saccata*.

⁵ *L. piratica*.

can perform the same feat, either to escape enemies or to pursue game, the various winged insects which skim the face of the same liquid mirror.

The power of fasting for long intervals between their sanguinary repasts, is another characteristic held by many of the larger predatory animals in common with the spider. One of the latter, kept by Vaillant for ten months under a sealed glass, was found reduced only in size, and not, seemingly, in health or activity.

To the devouring and amphibious reptile and the rapacious fish, the spider race no less offers its analogies in economy and disposition. Breathing by means of gills, they are able to dive, and walk under water, sometimes hunting on shore and plunging with their prey to the bottom. In the Diving Spider,¹ from whose singular habitudes we have spun elsewhere an imaginary tissue,² this faculty of respiration is further aided by that of carrying down a supply of atmospheric air to her sub-aqueous habitation.

Lastly, the analogy between the fly-catching spider and the fly-catching vegetable is by no means so remote as may appear. It is an opinion generally received, that the latter, such as the catch-fly, the Venus's fly-trap, and the pitcher-plant, appropriate to their own nourishment, if not the very juices of the insects they entrap, the air at least evolved from them in the process of putrefaction; and, this admitted, the imprisoning vegetable, and the imprisoning animal, the one subsisting wholly, the other partially on the juices of their victims, must be allowed to be tolerable representatives of each other.

But we have dwelt, perhaps, over long on those exceedingly ugly features of resemblance by which the spider is marked out so clearly as a member of that cunning, ferocious, flesh-eating family of which we constitute the head. Let us turn now to the brighter side of the *Aranea* portraiture,—for a

¹ *Argyroneta aquatica*.

² See "Fresh-Water Syren;" also "A New Gallery of Practical Science."

brighter side belongs to it. Against spider vices we have a set-off of virtues. Foremost among them stands *maternal tenderness*, or its very image, shown in the devoted care evinced by weaving mothers of the "treasure" they "tie up" so carefully in "silken bags;" and not alone do they care for it while thus enveloped in the shape of little senseless eggs, but when from each egg has issued forth a little sentient spinner.

Perseverance is another admirable trait for which the spider is eminently conspicuous. No one can deny it;—no one who has ever watched a garden spider in the construction or the reparation of her geometric web, who has noticed her doubling and redoubling the lines by which her fabric is to hang suspended, testing repeatedly their power of support by suspension from them of her own weight as she drops herself, now here, now there, from different portions of the thread. See her in construction of her woven wheel, measuring carefully by her provided ruler—one of her own legs—each spoke or radius, and each circular mesh which interlaces them; and behold, finally, after all is completed, so neat, and trim, and regular, how that when her cords are sundered by the struggles of some powerful captive—may be, by a Samson blue-bottle—she will set to work again so cleverly, so patiently, to repair her broken snare.

In the death of the darker superstitions which used once to attach to spiders, the remnant of one more cheerful still survives in the name of the "money-spinner," and the toleration, even complacency, wherewith, in comparison with the rest of her sisterhood, this little visitant is still regarded; and truly this shadow of a fancy would be worth the keeping if people would but invest it with the substantiality of a moral such as the "worthy" Fuller thus sets forth: "When a spider," says he, "is found upon our clothes we used to say 'some money is coming towards us.' The moral is this. Such who imitate the industrie of that contemptible creature, 'which taketh hold with her hands, and is in king's palaces,' may, by God's

blessing, weave themselves into wealth and procure a plentiful estate."

But while the idle out of mischief may take a lesson of reproof, the wavering or the idle, out of faint-heartedness, may derive one of encouragement from the perseverance of the "money-spinning" family. We have all read how that the royal hero Bruce, when fleeing before his foes a hunted wanderer, took, as an omen and an oracle, the labours of a spider, making his own decision for a last and final venture dependent, with the fate of Scotland, on the success or failure of its seventh effort for attachment of its line. How often has what is called our destiny, be we as individuals great or humble, seemed suspended on a thread as slender, a thread we are too apt to look on as a Parcæ's line, the work of, and liable to be cut in two by, a capricious power out of and independent of ourselves.

But not only have hope and courage been infused into the heart through the instrumentality of an insect weaver, but when no human shape of charity could approach to cheer it, the desolation of a solitary prison has more than once found assuagement in the welcome companionship even of a spider. Who has not read of M. Pelisson, the hapless inmate of the Bastille, who, taming his little comrade, taught it to come for food at the sound of his flute; and of that other Frenchman, Quatre Mère Disjonval, who, during an imprisonment in which spiders were his sole companions, beguiled the weary hours by watching their movements and proceedings as connected with atmospheric changes,—the observations thus made forming materials for a work published in 1797, on Arachnology, or the art of interpreting weather from the webs and motions of the spider race; while in times more recent, "*una bella ragna*," on his dungeon wall, became the pet of Silvio Pellico.

To return to the virtues of Arachne, we shall close our list of her recommendable qualities by that of cleanliness, wherein she rivals even her direst enemy of the broom, even the worthiest descendant of such assiduous maidens as were wont,

in the days of Faëry, to receive ever and anon a silver recompense in the shape of "a sixpence in their shoe." As such a maiden with her carpet and her curtains, for ever sweeping and shaking, and thereto adding the personal propriety of never failing to "clean herself" when her work is over, so does the domestic spinner with her web, shaking it and dusting it, then smoothing down her person, and combing her hairy legs, till no unseemly particle is left to disfigure her attire or abode.

In addition to perseverance and neatness, the spider numbers, as we have seen, amongst her more pleasing attributes a large amount of ingenuity; but we do not enlarge here either on its mode of exercise or the works of constructive skill by which it is exemplified, these having formed subjects more or less direct of former essays. We have only done our best to rescue the hairy-legged spinner from unmerited dislike.



Snare-setting animals, men and spiders



On the capal in front are several insects and objects of insect fabrication, such as might have been suggestive to man of the Art of Navigation. Nearest, on the right, rowing itself down the current, is a Boat-fly; on a line with it, to the left, the egg-boat of a common Gnat; and betwixt them, the raft of a raft-making Spider, bearing its constructor. Closer to the rail appears the diving-bell of the Diving Water-Spider. The case at the back is occupied by various specimens of insect skill, and a few of the tools employed in their construction. On the lowest shelf, to the right, is the nest of the Mason Bee, with its hole of entrance; cells, the work of a similar insect, appearing in the mortar of two detached pieces of wall placed behind it. Next to these, in the compartment adjoining, is a fragment of sand-stone, in which are several nests of Mason Wasps, with the leaning or curved towers raised over them in process of excavation. Beside these, is a piece of wood tunnelled, for her nurseries, by a Violet Carpenter Bee, each divided into cells by partitions of cemented sawdust, and stored with heaps of pollen. The perforations in the wood are openings to passages which communicate with the cells. Next in order, is another specimen of the same; and nearer to the left is the nest of another Bee Carpenter, also tunnelled in a piece of wood, but divided by partitions of clay, instead of sawdust. The first object to the right, on the shelf above, is the cell, as constructed in earth, of an Earth-Mason Caterpillar. It is open, to show the interior, which is smooth, and lined with silk for the comfort of the chrysalis which lies within. Next, on a piece of wood, and composed of detached fragments of the

same material, is the cocoon or cell of a caterpillar of the Puss Moth. The next is that of a Goat Moth—the winter abode of its long-lived larva in the heart of a tree;—a portion of the wood wherein it is embedded, being cut away, shows its fabric, a cloth-like substance of mingled silk and raspings of wood. On the upper shelf of all are three tools, used by insect artificers. To the left are the powerful toothed jaws, constituting chisel, plane, and forceps of a Mason Wasp. Next, in the centre, is the compound tool, consisting of an auger and a pair of files, used by the Tree-hopper, to make grooves in branches for the reception of her eggs; and to the right, is a portion of the saw used by Saw-flies for a similar purpose.

A NEW GALLERY OF PRACTICAL SCIENCE.



LADIES and Gentlemen of a mechanic turn, we can introduce you to a new theatre of exhibition, where ingenious mechanisms, arts, and manufactures are in daily operation. There, without payment of a shilling, you may look upon diving-bells and balloons—see bodies propelled through water by the strokes of an internal piston—examine the models of a life-boat and a raft—observe the effect of cleverly-constructed buoys—behold in practice, or in their finished productions, the crafts of masonry, carpentry, spinning, weaving, and paper-making—see the operations of and the implements for boring and tunnelling, the exercises of rowing and diving, with various other clever and curious performances, of which the Polytechnic can do no more, and in many instances does less, than display the parallels. Should you even be of the number who frequent the above-named gallery for its music rather than its mechanisms, for its pictures rather than its philosophy, our theatre lacks not something to suit your humour.

The use of that most simple yet most powerful of instruments, the wedge, could have been suggested by an operation commonly performed by every species of bee; yet he who first hit upon this wonder-working implement would have no doubt

laughed incredulously on being told that he was using the same sort of agency to rend, perhaps an oak, as that employed by a bee beside him to effect its entrance or egress through the closed door of a blossom of a toad-flax or snapdragon. The insect, in accomplishment of this purpose, rests on the lower lip of the flower, insinuates its tongue between the upper lip and the valve, and then thrusting in its head, acts with it as a wedge to force the shut edges asunder.¹

Let us begin by a survey of what we shall denominate our hall. Around it flows an artificial canal, on the surface of which, stationary or in movement, we see a variety of what look, at a little distance, like diminutive model boats. These living boats, of which the like may be seen gliding in summer on the surface of every pond, are, in short, none other than boat-flies; and most appropriately are they thus named. See, as they strike out regularly with their oar-shaped feet, how they cut through the liquid element, with their keel-like backs, their flat stomachs raised uppermost to form a deck, their broad, beaked heads the prow, their pointed extremities the stern.²

But of what is this tiny boat composed? and who the builder? In lieu of horizontal planks, its sides, as we lift it from the water, show an array of pyramidal bodies, small end uppermost and compacted close together. These are the eggs of the gnat.

Well, here, beside the edge of our canal, moored to an aquatic plant by some silken cables, we perceive, submerged all but the top, a bell or dome not very dissimilar in size and shape to the half of a pigeon's egg. Like that, and like a diving-bell, it is open at the bottom.

To give you on this point entire satisfaction, we will raise from the water and reverse our diver's habitation, even at the risk of disturbing its occupant, who has been also, we must tell you, its ingenious constructor. There,—the bell is uplifted, and we see him sitting within it, head downwards—a somewhat strange position; but it seems we have fairly routed him. He

¹ See "Insect Miscellanies."

² See Vignette.

falls!—falls, though, upon eight legs, and makes off at full speed, no matter whither. Our business is with his vacated abode,—a dome woven, as we now see, of close-spun silk,—open, as we said, at bottom, impervious at top, with no orifice for entrance of water or of air.¹

But we must leave, for the present, these aquatic mechanisms, though as yet but half examined, that we may bestow a little of our notice upon a few other assembled specimens. Here is one insect, a sharp, waspish little animal, busied up to her eyes and ears in our own material for building, brick. Chipping away her hardest with a trenchant tool, she is employed in the work of excavation. To do her justice, we cannot but admit that she never leaves off; yet, for all her assiduity, her progress is but slow, for as, piece by piece, each about the size of a mustard-seed, she scoops into her hard material, she carries off each particle to some distance from the scene of operation.

We may take a look now at the more rapid proceedings of another independent labourer, and in appearance and attire not unlike the last. Like her, she also is an excavator, but she is something more,—more of an erector. She is employed upon a block of hard sandstone. Each few grains of sand that she thus detaches we see her kneading into a little pellet, and with the like moulded masses (her unbaked bricks) she has built already a circular wall or rampart round the edge of her excavation. Thus proceeding, as her pit deepens her tower rises, and will rise still, to the height, perhaps, of two or three inches.

Ask you now the purpose of these arts in their miniature exercise, and the name of their tiny exercisers? The latter, whom perhaps from their exterior you may have known already, are wasps, “mason” wasps,² mother wasps, and they are scooping their caves, and raising their towers, to provide secure asylums for their young.

Contiguous to the above we see some completed specimens of masonry of a somewhat different construction, the work of

¹ See Vignette.

² *Odynerus*.

another yet allied class of builders. Here is a dome-shaped tenement, composed apparently of mud or clay. Within it we discover two separate cells or chambers "of the form and size of a lady's thimble, finely polished, and of the colour of plaster of Paris." This material is not clay, but apparently the mortar of the wall on which, as we have said, the whole structure was originally placed. The cells, with their outwork of concealment, were once the nurseries of young bees of a solitary species,¹ and their mother, one of the "masons" of her tribe, was the clever architect and patient builder of the entire edifice.

Now let us look at some specimens of insect travelling. Here is a nest of a carpenter wasp.² It is wrought in a piece of wood, somewhat softened by decay, part, probably, of a post or pale. The tunnel, which is more square than round, is smooth within, chiselled as if by the tool of a veritable carpenter, and divided into as many as six separate cells or compartments, of which the partitions are no thicker than a card, and formed, not of sawdust (that having been carefully removed), but of kneaded clay, fetched as laboriously by the little builder, who herein shows herself an adept in masonry as well as in her own peculiar art. Within these cells, or some of them, is a portion of pollen, with which the bee-mother supplies her brood.

We are handling now what may be looked upon as a perfect *chef-d'œuvre* in insect joinery. It is the nest of a third apian carpenter, called, from the beautiful colour of her wings, the violet bee.³ She is not, indeed, a recognized native of our own island; but we can, nevertheless, in this her workmanship, admire and do justice to her constructive skill.

The material, wood, as in the former specimens, is, in this, perforated by several tunnels cut for about an inch obliquely, then in a perpendicular direction. Each of these tunnels is

¹ *Anthophora retusa*.

² Of the genus *Eumenes*.

³ *Xylocopa violacea*.

about a foot deep by half an inch wide, and divided in its length into separate cells about an inch in depth.¹

Who has not heard or read of the rock-hewn temples of the East? of the far-famed cave of Elephanta,—that masterpiece of excavated architecture,—with its pillars and pilasters, its statues, its relievos of gigantic bulk, cut, all, out of the living stone (when, who knows?) by that dwarf in comparison to these his works, that ephemera in comparison with their duration, Man? But there are insects of another sort who have been working in ages as remote, and who work still, at excavated structures, which, as measured with their own statures, are more gigantic by a thousandfold than the sculptured Elephanta or the erected Edfou. These also are “carpenters”—carpenter ants, their craft headed by the jetty emmet.² Their entire structures are, of course, too bulky for transportation to this our museum gallery; but here, in some several fragments, we may look upon their “walls, their galleries separated by partitions with oval apertures or door-ways, their pillars, arches, columns, and arcades;” all wrought with wondrous lightness and delicacy, and all dyed of a dark, bordering on a blackish hue, how produced would seem uncertain, but peculiar to the excavations of these jet-black labourers—not the only ones which cut their sculptured cities in the trunks of trees.

But these “carpenters” must no longer detain us, or we shall want time to bestow a glance, even, upon their brother “Weavers.” Upon the process of their manufacture we hardly can, though many are here assembled and busy at their work. We may look, however, at a few collected specimens of their clever spinning, as exhibited in a variety of cocoons, from the looms chiefly of “Moths as Operatives” in their caterpillar estate.

Here we have them from a veil of delicate net-work to a covering thick and warm as cloth.

¹ See Vignette, and refer to description.

² *Formica fuliginosa*.

Some (as those of the silk-worm) are of pure silk, mingled in others, in various proportions, with baser materials, such as hairs from the weaver's own body, particles of wood, bark, or earth; while a few are distinguished by partaking largely of animal secretions, widely different from silk, such as (in the lacquey) a powder resembling brimstone, and (in the oak-egger) a calcareous substance not dissimilar to the crust of an egg. This cocoon of the Hawthorn Saw-fly,¹ exposed with its occupant all through the winter upon leafless hedges, is composed of a material tough as leather, but much harder (also an animal secretion). Here is an empty one with a curious lid set open as for the exit of the perfect fly, which, furnished with an adapted tool for the cutting of this singular trap-door, never fails in its circular excision to *leave entire just such a portion as serves for an attachment and a hinge*.

With a look at one other fabric, we must take leave for the present of insect manufactures.

This greyish-white substance is *paper*,—a paper strong, smooth, and durable, such as, if in sheets of size sufficient, we might even now be writing on. It is composed of vegetable fibres, reduced to a pulp, united by size or glue, and spread out into thin leaf. It is wrought by an artificer, who adopts a process precisely similar to that employed by those among us of the same occupation, only with more invariable success and skill.

What may be the name of this clever paper-maker? This specimen of work nearly discloses it. It is an aggregated collection of hexagonal cells, in all but material resembling a honeycomb; and a comb it is, a portion of one taken from the nest of a common wasp.

Now let us examine a few insect tools. Wonderful alike for its simplicity and the manifold uses which it is made to serve, here is the double *pickaxe*, each blade toothed on the inner edge, acting thus all the better as a fast-holding pair of *forceps*,

¹ *Tenthredo*.

as well as a cutting *chisel*. This, the compound tool, only slightly varied with different possessors, is the only tool of the "wasp mason, carpenter, and paper-maker." A pair of wasp mandibles or jaws constitutes the instrument now before us.¹ A hard bony substance is the material of which this and nearly all insect tools are constructed.

A *saw* is the implement which next presents itself,—a tool much resembling, only more complicated than that of our own carpenters: we may call it rather a pair of saws, or a compound saw, when in use working simultaneously at one cut. The instruments are so exceeding fine and delicate as to need support, and we see accordingly, that their backs are set within a groove. The teeth, instead of being simple, are denticulated with others cut more finely, which confers on this tool the additional properties of a rasp or file.¹

What are its uses and by whom employed? Its purpose is to cut grooves in the branches of trees and shrubs for reception and protection of insect eggs; and the insect by whom the grooves are cut is a maternal *saw-fly*.

Here is another tool of surpassing nicety, lodged in a closely-fitting sheath, from which, on slight pressure, it is seen protruding. It is large enough for partial examination even by the naked eye, and, when thus viewed, appears a spike of equal thickness, except at the point, where it is broader and angular, and on both sides indented with teeth. Now let us behold it in the microscope. The teeth, strong and sharp, are, we can see now, about twelve in number on either side, and diminish in size as they approach the point. But what else reveals our magnifier? Why, it shows that the instrument which appeared simple to our naked sight is made up in reality of three distinct pieces, the two outer ones armed with teeth, and called² "files," the central one pointed like a lancet, and not denticulate. The side pieces can be moved backwards and forwards, while the middle one remains stationary.¹

¹ See Vignette.

² By Réaumur.

The carpenter, or carpentress which owns it, is the female Tree-hopper, or *Cicada*, who thus cuts the branches, while her mate "bursts the very shrubs" by his shrilly music.

Our next more simple instrument is an awl, or piercer, which issues from a sheath, in form of a curved needle. It is the piercing ovipositor of a Gall-fly, and, though a great deal longer than the insect's body, is, by a mechanical contrivance, nicely adapted to it.

We have here another borer, or brad-awl, defended by a sheath, which opens lengthwise, like a pair of compasses. The awl itself is single, nearly three inches long, and terminates, not in a simple, but a serrated point. This is the instrument of that large common ichneumon,¹ which, for deposit of her eggs, pierces through the clay defences of a "mason" wasp's nest.

Here, as seen in the microscope, is a small needle,—a needle of human manufacture. Its point appears "above a quarter of an inch in breadth, not round nor flat, but irregular and unequal; and the surface, so smooth and bright to the naked eye, seems full of ruggedness, holes, and scratches, like that of a rough iron bar."²

Beside this clumsy piece of workmanship is now introduced another, by an infinitely more skilful hand, which exhibits "a polish most amazingly beautiful, without the least flaw, blemish, or inequality, and ending in a point too fine to be visible."³ *This* we might suppose to be our insect weapon—a natural as contrasted with an artificial needle; but no such thing; it is not the weapon, only the weapon's *sheath*. This opens longitudinally; and now we discover what it enclosed, viz. two darts, distinctly separate even to the base. We can see further, that these darts are each of them armed with ten saw-like teeth, such as occasion the instrument, sheath and all, to remain frequently within the substance wherein it may be plunged. In truth, this is a formidable-looking tool of torment; but poison

¹ *Pimpla manifestator*.

² Hooke's "Micrographia."

³ Hooke.

also comes in aid of its lacerating power,—liquid poison, contained in an attached bag, from which, on pressure by a mechanical contrivance, it is ejected into the wound at the moment of its infliction. This deadly weapon is a bee's sting.

We are shown next the blood-drawing stiletto of a gnat. We inspect it with an unaided eye. It seems to us a needle, solid, pointed, fine as a hair. We see it in the microscope, and in lieu of a simple needle, we behold a compound of several pieces, some of which are barbed. These are the *piercers*, while the sheath which encloses them is the *sucker*, which completes the apparatus.¹

¹ See Réaumur, Swammerdam, Burmeister, and "Insect Architecture."



We challenge all Nations!



The subject of this Vignette is the Parsonage House at Barham, Suffolk, of the late venerable and lamented Mr. Kirby, the distinguished author, in conjunction with Mr. Spence, of the well known "Introduction to Entomology," and of one of the "Bridgewater Treatises." The Wasp in the foreground, employed in cutting off the wings of a fly with a view to its more convenient transport, is illustrative of an anecdote given by Dr. Darwin, and quoted by Kirby, in his observations on two classes of insect activities—those prompted solely by Instinct, and those guided by apparent Reason.

TWO THINGS OF DIFFICULT DEFINITION.

NATURE is now daily locking up from observation, although in no spirit of a miser, more and more of her vegetable treasure, and therewith is hidden from our view nearly all of those insect myriads which filled the summer air. This dearth comparatively of outward objects of interest inclines, or in a measure drives, us to seek for others of

a kind not palpable to sight; and as the decline of life, with the failure of its active energies, affords greater leisure, and should excite increased desire to look within ourselves, so the decline of the year gives time, and naturally leads us to inquire into the nature of those inward springs by which are set in motion all the outward activities which have formed, hitherto, the chief objects of our notice.

By the animating principle of the insect world, we do not, of course, mean that of mere vitality, common alike to animal and plant, but that endowment of perceptive and apparently judging mind which directs the former in its various operations.—Instinct shall we call it? Reason? or a combination of both?

Perhaps the best definition of insect and other animal instincts is that given by Kirby, who considers them as “unknown faculties, implanted in their constitution by their Creator, by which, independent of instruction, observation, or experience, and without a knowledge of the end in view, they are impelled to the performance of certain actions tending to the well-being of the individual and preservation of the species.”

Through *Instinct*, that endowment which is usually as perfect in the insect's creeping infancy as in its soaring adolescence, all caterpillars are directed to find, or more properly to appropriate, the food *instinctively* provided by the mother's instinct, while some, even before that provision is attacked or cared for, are bidden by the same imperative power to shape and clothe themselves with garments made generally out of the same material as that to be employed for food. Of this we have seen examples in the clothes-moth in its state of infancy, with others of the same tribe (*Tineidæ*) which make to themselves cases, or moveable tents (whence they are called tent-makers), out of leaves, bark, and other substances.

The weaving, most ingeniously, of variously-formed cocoons, more or less solid, according usually to the period of their occupation,—the suspending themselves no less cleverly, and in

places of security, for the process of transformation, are performances no less admirable of the caterpillar crew; and the instinct which directed them, dormant for awhile, with other faculties, in the chrysalis, wakes again in the winged insect. Thereby directed, the moth or butterfly, perhaps guided also by her taste and smell, repairs directly to the flowers whereon she loves most to take her pleasure; and then, in opposition to those very senses, proceeds, at Instinct's bidding, to the flowerless shrub or vegetable, for deposit of her eggs on the leaves best suited to support her unthought-of progeny.

With bees, ants, and other social insects, Instinct would not appear, as with the *Lepidoptera*, to spring from the egg in full maturity, not at least with the active and varied powers afterwards acquired. In bee grubhood, also in that of wasps and ants, the instincts of imbibing nourishment and of spinning their cocoons would seem the only ones in activity, the place of all others being supplied by that watchful assiduity, also instinctive, with which the labourers of the hive or ant-hill tend upon the young of their communities. But no sooner does the bee attain to maturity, than Instinct, in full development, like the form over which it is to bear rule, impels the wings untried, to carry their possessor by the shortest cut to the flowery fields of her earliest labour; then reconducts her to her straw-built home as unerringly as though she, the tyro gatherer, were the most veteran collector of the hive.

But does reason shine alone for man of all the inhabitants of earth? Men there are, not perhaps of those who best cultivate this most improveable possession, who would yet for themselves and kind claim its exclusive monopoly. Such as these must grudge of course to the gigantic elephant even the *half-justice* commonly awarded him in the epithet of "*half-reasoning*" animal; and looking on *him* merely as an enormous clock, of which the clumsy machinery is worked alone by instinct, what other can they do than regard as a tiny watch that insect miracle yclept an ant? None acquainted at all with the chronicles of ele-

phantine performance, can be at a loss for facts, not isolated, entirely at variance with the idea of making of the elephant a mere monster machine; and as for the ant, the following relation,¹ with a thousand more, would read strangely of a mechanic agent:—

“I saw an ant pulling with his mouth a piece of wood. The rest were busy in their own way; but when he came to an ascent, and the load became too much for him, three others came immediately behind, pushed it up to level ground, and then left him. The end he pulled was the smallest, and, as he drew it between two things, it stuck there. After several fruitless efforts, he went behind, pulled it back, and turned it round.”

Proceedings such as these accord certainly much more closely with the opinion of the enlightened and pious Sharon Turner (by whom the fact is quoted), that “the actions and habits of the insect world display the same kind of animal mind [allowed by the same writer to be *judging* mind] and feeling which birds and quadrupeds exhibit. If there be a difference, it is not to the disadvantage of insects, for ants, bees, and wasps, and especially the smallest of these, ants, *do things, and exercise sensibilities, and combine for purposes, and achieve ends, that bring them nearer to mankind* than any other class of animated nature.”²

We insect men may not relish, perhaps, or care to observe, this approximation towards ourselves, of men-like insects. We would rather, perhaps, make the most of the inferential argument, that because insects proper have avowedly a very large share of instinct, they have therefore no reason at all. We might as well infer of ourselves, contrary to facts, that because we may have a large share of reason we are utterly devoid of instinct.

The practice of ants to rear aphides for the future consump-

¹ From the “Imperial Magazine.”

² “Sacred History of the World,” vol. iii.

tion of the sweets they furnish, bears equally the character of instinctive prescience.

Instinct can also on occasion vary as well as err; often displaying, among insects, its capability of accommodating itself, like reason, to circumstances. This is continually exemplified in the case of caterpillars, which, when confined to a box, will employ bits of paper and other chance materials in lieu of the grains of wood or earth with which nature is accustomed to supply them. Another instinctive operation varied to meet exigence is instanced by Réaumur, in the proceedings of a little elm tent-maker, whose tent or case of leaf-skin having been cut open at the side, was sewn up by its little occupant, instead of being supplied by a new one, as unvarying instinct would have prompted.

We have given, elsewhere,¹ Dr. Darwin's often-quoted anecdote of the wasp and the dead fly, whose wings, when found on trial to be obstructive of its convenient transport, the wasp alighted to cut off. Kirby remarks on this relation, "Could any process of ratiocination be more perfect? Instinct might have taught it" (as we believe it usually does) "to cut off all the wings of all flies previously to flying; but here it attempted to fly with the wings on, and was impeded by a certain cause, discovered what that cause was, and alighted to remove it." Did not the discovery of this cause imply also memory, and a gain of knowledge from experience, by which alone the wasp could have been taught, or reminded, that the wings of the fly were the impediments to his flight—have given him at least reason to suspect it from the greater facility with which he had transported bodies that were wingless?

A trick, asserted by Huber to be on occasion resorted to by humble-bees for the purpose of extracting honey from flowers that are deeply tubular, has been adduced as another striking instance of the capability of insects to profit by experience. These humming honey-suckers usually extract the nectar from

¹ "Defence of Wasps."

the natural opening at top of the bean and other tubular flowers; but when by the breadth of their shoulders forbidden entrance into this narrow passage, they drill a hole with their proboscis through the calyx right into the tube, and in this manner tap their luscious wine, while the less bulky Bacchanals of the same species quaff it in the ordinary way.

It is not ours to boast ourselves of any talismanic gift, enabling us to "understand the steven" of parleying insects; but we never watch the busy workers of the ant-hill, coming and going, stopping as they encounter, and laying their heads together, without being pretty certain that they are saying to each other a something quite as full, perhaps, of informing or of friendly significance as the "Fine day," or the "How do you do?" which forms the usual salutation of meeting men.

We may often, too, perceive an ardent little labourer of the same race toiling at a burden—may be, a great dead blue-bottle—may be, a fragment of wood five times bigger than herself. After repeated efforts, she finds her strength unequal to remove it, and then bethinks herself (for think she must) that two or three united forces, and several pairs of forceps, are better than one, and, acting on the thought, we see her approach another or perhaps a group of her comrades, conduct them to the spot where she left her load, and succeed by their assistance in its transport.

On the borders of a path or roadway leading through Highgate wood towards Hornsey, were scattered several of the conical cities of the red or wood ants. These, in their comings and goings, were accustomed continually to cross the thoroughfare, in doing which many among them fell victims to the feet of the passers-by. The intelligence of the survivors extended not certainly to the length of making them take warning by the fate of their comrades; yet they seemed to observe and sympathize therein. We have repeatedly noticed them stopping, first one, then another, on discovering of a dead mutilated body, till a group of several is collected round it. Sometimes,

after an apparent consultation, the individuals separated, leaving the remains where found; at others, singly or together they attempted and accomplished their removal.

That with relation to each other, the instincts or the affections of insects are not, then, as has been imagined, wholly selfish,—that, however circumscribed their sphere, they yet move in a circle beyond the central point of sensual gratification or self-preservation, is scarcely, we think, a matter to be doubted; but how far the mental principles of these little creatures, like those of the larger animals, can communicate with, or may in any degree be susceptible of, influences from the “master-mind” of man, is a question which most people would deride rather than attempt to answer or consider.

From the story of M. Pelisson’s spider, which always descended for the meal wherewith he was accustomed to provide it, on hearing the sound of his flute, we may not infer, perhaps, that spiders in general are gifted (as would appear with the seal) with a soul for music. That particular spider, as well as his race, had probably only a taste for flies; but from the fact related, the inference is plainly deducible, that they are capable of receiving through their senses other impressions than those absolutely conducive to their support, and that they have in their minds a power of connection such as mere instinctive impulse neither requires nor exhibits.

Supposing the insect, in common with all other animal minds, to possess this extent of capability, we shall not laugh at Réaumur’s expression of “the *tamed* moth,” which sipped syrup off his finger, or doubt the relation of an English naturalist, who tells us of the humming-bird hawks, which, when on wing at their flowery repast, flew away frightened by his presence, till, tamed by custom, they learned to continue unalarmed the discussion of their delicate banquet.

In speaking of animal natures in connection with our own, we cannot forbear extract of a few remarks bearing on the subject, by an American writer who has broached some new and intelligent ideas on the development of mind:—

“ Everything which surrounds us is full of the utterance of one word completely expressive of its nature. This word is its name, for God even now (could we but see it) is creating all things, and giving a name to every work of his love, in its perfect adaptation to that for which it is designed. But man has abused his power, and has become insensible to the real character of the brute creation, still more so to that of inanimate nature, because, in his selfishness, he is disposed to reduce them to slavery.

“ We find the animal world either in a state of savage wildness or enslaved submission. It is possible, that as the character of man is changed they may attain a midway condition removed from both. As the mind of man acknowledges its dependence on the Divine Mind, brutes may add to their instinct submission to human reason, preserving an unbroken chain from our Father in heaven to the most inanimate parts of creation. * * * Everything will seem to be conscious of its use, and every man will become conscious of the use of everything.”

But it is more in our province to illustrate than to argue. Let us show, in conclusion, how two poetic minds—Christian men of different countries and differing creeds—have thought and written on this our reconciling speculation. A canine favourite is the object whereon is made to hang with both poets their sentiment and belief; but allowing continued existence to the dog, we must not deny it (admitting the resemblance of their forms of mind) to the ant or to the bee. Thus, our Southey, on the death in old age, by drowning, of a faithful friend and companion of his youth :—

“ But fare thee well! mine is no narrow creed,
And He who gave thee being did not frame
The mystery of life to be the sport
Of merciless man! There is another world
For all that live and move—a better one!
Where the proud bipeds, who would fain confine

Infinite Goodness to the little bounds
Of their own charity, may envy thee."¹

And thus, in substance, though in words which do but sorry justice to the beautiful lines of the original "Episode," does no meaner man than Alphonse de Lamartine address his real or imaginary favourite :—

" My dog ! the difference between thee and me
Knows only our Creator ;—only He
Can number the degrees in being's scale
Between thy instinctive lamp, ne'er known to fail,
And that less steady light of brighter ray,
The soul which animates thy master's clay ;
And he alone can tell by what fond tie,
My look thy life—my death, thy sign to die.
Howe'er this be, the human heart bereaved,
In thy affection owns a boon received,
Nor e'er, fond creature, prostrate on the ground,
Could my foot spurn thee or my accents wound !
No, never, never, my poor humble friend,
Could I by act or word thy love offend !
Too much in thee I reverence that Power
Which formed us both for our appointed hour ;
That hand which links, by a fraternal tie,
The meanest of His creatures with the high.
Oh, my poor Fido ! when thy speaking face,
Upturned to mine, of words supplies the place ;
When, sentry by my bed, the slightest moan
That breaks my troubled sleep disturbs thy own ;
When noting in my heavy eye the care
That clouds my brow, thou seek'st its meaning there,
And then, as if to chase that care away,
My pendant hand dost gently gnaw in play ;
When, as in some clear mirror, I descry
My joys and griefs reflected in thine eye,—
When tokens such as these thy reason speak
(Reason, which with thy love compared, is weak),
I cannot, will not, deem thee a deceiving
Illusive mockery of human feeling,—

¹ Southey, 1796.

A body organised by fond caress
 Warmed into seeming tenderness,—
 A mere automaton, on which our love
 Plays, as on puppets, when their wires we move.
 No! when that feeling quits thy glazing eye,
 'Twill live in some blest world beyond the sky.

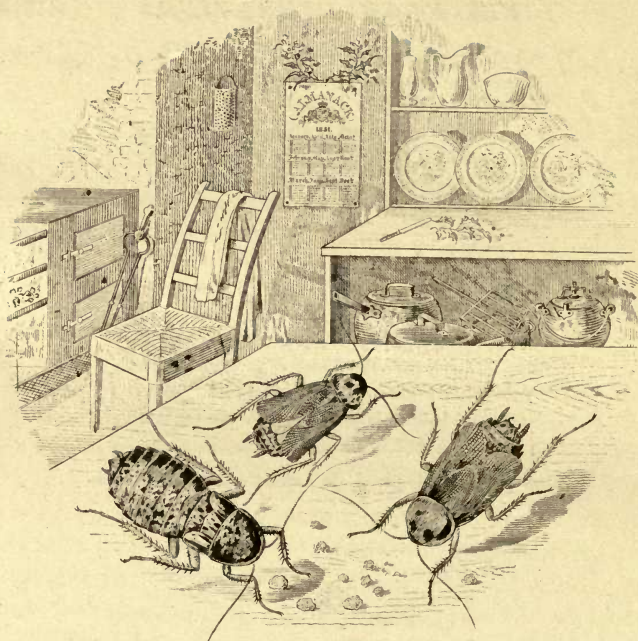
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No, God will never quench his spark divine,
 Whether within some glorious orb it shine,
 Or lighten up the spaniel's tender gaze,
 Who leads his poor blind master through the maze
 Of this dark world; and when that task is o'er,
 Sleeps on his humble grave, to wake no more."¹

¹ "Jocelyn," Episode par A. de Lamartine, tome ii. p. 155.



More ways than one of getting to the bottom
 of a secret.



A trio of common Cockroaches (*Blatta Germanica*), commonly misnamed Black Beetles, are the invaders of the kitchen here represented.

THE SPIRITS OF HEARTH AND HOME.

A CHRISTMAS STORY.

MEMORY! painter of the past! let us invoke thee! Ah! but thou art too busy: we want but a single subject, and now, with a few touches of thy magic pencil, thou hast brought before us pictures enough of persons and of scenes to furnish an entire gallery,—pictures self-arranged, of which the clearest and the warmest-tinted are those most distant.

First, there is a landscape, half rural, half marine, of a village near the Kentish coast,—an old-fashioned quiet little village, with its heavy-headed chimneys appearing here and there amidst embowering elm-trees; more distant, the square spireless

tower of the ancient church ; and behind all, caught at intervals, the line of ocean, defined and dark, or mingled almost with the blue horizon.

Towards the centre of this wood-cradled nest, there stands, in the foreground of our picture, an old quaint-looking residence, itself a cottage, but distinguished from the lesser and lowlier of the assemblage by its magnitude, its flight of steps ascending from the pathway to the garden gate, its surrounding shrubbery and flanking fir-trees, its trellised porch and arched doorway, its casemented bay-windows, and its clustered chimneys. Three other pictures (family and domestic portraits) we must take down, next, from our memory-furnished gallery. All are of dwellers in the cottage just described, the principal residence, and eke the vicarage, of the village of H——.

First, we have its reverend master, of build substantial and air unpretending as his abode, of middle age, middle stature, and mediocre features, a man altogether made up of middlings, except that he seems invested with a portion more than middling of indolent good humour. Most easy vicar ! dearly did we love thee ; but only in proportion to thy claims upon our young affections. Thou wert our kind uncle, and, much more, scarcely less a father unto us than to thine own only little daughter Lucy ; and thou wert, moreover, our tutor, our earliest instructor in much of varied knowledge,—truly more varied than profound. Thyself an entomologist (albeit of no zealous stamp), 'twas thou first set us on our hobby, and for this alone we should revere and love thy memory.

Two humbler personages hang, in their portraitures, beside our uncle,—humble, yet withal of vast importance in his household, which, for several years, had been without a mistress.

One is the widower's housekeeper, the nurse of his little Lucy, and once his own, old Dolly—Dolly Dove—than whom no feathered parent of the dove-cot ever spread a wing more tenderly over her cherished nestlings.

The other portrait is that which presents the figure of Dolly's

fellow-servant, our uncle's butler, valet, amanuensis, and librarian, eke our writing-master (Lucy's and mine), the angular, bony, spindle-shanked, high-shouldered, hard-featured, hard-minded, if not exactly hard-hearted, Caleb Caligraph, who could never from his cradle have looked young, and could never to his grave have appeared absolutely old.

Now, last of our pictures, comes an interior, a scene by firelight within the cottage parsonage depicted in our first. Here is the large low kitchen, opening out of the large low hall, with its open rafters apt for the double duty of supporting superincumbent chambers and dependent hams; its dresser of like solidity, only of more fair complexion, and displaying on its shelves a bright array of blue-edged platters and polished pewters, both shining in cold disdainful rivalry against the ruddy coppers underneath; the whole illuminated by the glare of a Vesuvian mountain of wood-crowned coal, glowing at bottom, blazing at top, crackling and spluttering, rejoicing, as it would seem, within its ample range, that its culinary labours, for the day, are ended.

Our interior is not entirely a picture of still life. Seated, one on a low stool, the other on a wooden chair beside the fire, are two children—a little white-frocked girl of perhaps nine or ten, fair, and looking fragile as a flower, and a boy some three years older, and by his garb seeming, like herself, a visitor only to the kitchen. The girl is as at Christmas—Christmas fifty years ago—appeared our little cousin Lucy.

At the period when the above scenes and persons were invested with reality and life, the 23rd of December used to be a red-letter day in our then short calendar. It was that on which our uncle was accustomed to entertain a party of old college friends; and we and our cousin, our company superfluous in the parlour, were permitted to bestow it in the kitchen, there to take tea with Dolly Dove and Caleb.

In the kitchen, then, behold us, by firelight,—Lucy and I, and a large white cat.

It was a tempestuous winter's evening : the sleety rain came every now and then pattering against the casement, and falling in hissing drops upon the thirsty flames ; and when the showers remitted of their battering violence, we only heard more plainly the howl of the east wind in the tops of the old fir-trees round the house, and the creaking of a rusty weathercock on an adjacent dove-cot, with the sharp gallop of a hurried horse upon the hard high road, followed by the angry bark of our house-dog Keeper ; but of all these varied sounds, nearest and most distinct, and diverting speedily our attention from them all, was the chirp of a cricket from between the bricks of the glowing hearth.

Presently there came a sound of foot-scraping at the kitchen back door, which opened and gave entrance to a gust of east wind, and to Caleb Caligraph, returned from seeing that the visitors' horses had been, like their masters, hospitably entertained.

Having rid himself of hat, great-coat, and lantern, Caleb joined our company by deposit of his stiff ungainly figure in his own arm-chair, in which, by the way, he never seemed to take his ease ; not, however, till he had duly recognized our presence by two separate inclinations of his queer, incomplete-shaped head, inclinations of two-fold character,—half, bows of respect to his master's daughter and master's nephew, half, nods of patronage to the children he had known from infancy, to whom he had imparted, or was imparting, of the art and mystery of penmanship and figures, and to whom, above all, he had given presents,—the annual present, that is, at Christmas, on the exact anniversary we commemorate, of a king and queen of gilt gingerbread.

When our party of four was finally arranged,—Mr. Caleb in his arm-chair on one side of the fire, Mrs. Dove presiding over her tea-board opposite, we, their guests, in intermediate places by the table,—my little cousin began to relate how we had seen the cricket, and to repeat, with a little of my prompting, a few

couplets of a "Cricket Song." Dolly listened with grave attention, and when the rhymes were ended,—“I can't say,” said she, “that I ever heard a cricket sing as plain as that; but there's no knowing, they're such wonderful creturs in their doings, lapping the milk as natral as old Tom there, and eating bread and butter as hearty as a Christian. Then to see how they run amongst the red-hot ashes with never a foot burnt or a whisker singed, just like, if I may say so, the three holy children in the book of Dan'el; and what's most unaccountable of all, and what makes me think above all that they must be of the natur of sperits or fairies, they comes and goes all of a sudden, nobody can tell when or how.” “Why, Dolly,” said I, “they can burrow, you know, and creep through crannies; besides, they have large wings to carry them wherever they please.” “Well, dear, if they have, they're not like a rale insect's, a fly's or a bee's, standing out plain and straight to be seen by everybody; besides I've never seen one a-flying of the hundreds as used to come to this fire-place. But let 'em come and go however they may, one thing is certain, good luck comes with 'em, and, whenever they go, turns tail at the same time. Crickets is certainly wonderful creturs,—if not sperits, more like 'em than anything else that comes about us.”

Lucy looked round fearfully, and got closer to her nurse's elbow, as the latter brought thus to an emphatic termination her monographs on the families *Achetidæ* and *Blattidæ*. They were followed, also, by a sound, compound of groan, cough, and whistle, from the liny lips of Mr. Caligraph, succeeded by the sententious apothegm—“Superstition is the daughter of Ignorance,” uttered with a look of unmistakeable application to Mrs. Dove, who, dove as she was, seemed slightly ruffled. “I know,” said she, “though I'm my father's own daughter, that I'm not so wise as some folks, but I think, Mr. Caligrub, you might be a little more perlite, now at Christmas time, and in the company of little Miss here, and Master.” “Why,” returned the butler, alias librarian, alias writing-

master—"respecting the young lady and young gentleman, I must take leave to observe that 'youth is apt at learning,' and that—ahem!—"to instil false notions is not good. 'Fairies are fabulous,' and so, in my opinion, are spirits too,—I always set my face against them, always did; and as to crickets and kitchen beetles, those mean hinsects, of, I should say, the genus *Hachetidy* and *Blatty*, to talk of *their* being fairies or spirits, why"—

Here the fire-side chirper, who for the last half-hour had been perfectly mute, burst forth with such shrilly loudness as nearly to overpower the low husky voice of the prosaic setter-down of Dolly's superstitions. Caleb gave a violent kick with his great splay foot against the side of the fire-place, over the very spot whence the insect's voice proceeded. Down fell some flakes of plaster, and away, over the heated hearth, towards its opposite side, scampered the assailed cricket. But his movements were not half fleet enough for the ruthless Caleb, who, deaf to our interceding exclamations, and regardless even of falling embers, seized the hapless runaway by one of his long leaping legs just as he had made good his retreat into a snug cranny between the bricks.

Thus hard pressed and hard pulled, the cricket abandoned his leg, and leaving it, a trophy, in the hand of his persecutor, disappeared within his hard-won place of refuge. Lucy burst into tears; I, to see her, doubled my fist, and actually dealt our writing-master a sound blow; and as to Dolly, no words, no pencil can depict the change that came over her. She neither shed a tear nor would she have struck a blow,—hardly felt, perhaps, either sorrow or anger, all else swallowed up in a sudden shuddering presentiment, fearfully anticipative of some coming calamity connected mysteriously with the violence just done to the cricket, the last cricket of her hearth, the last good genius of our home.

Well, Mr. Caligraph was certainly sorry or compunctious

for having maimed, perhaps killed, the cricket, and so shared in a measure the discomfiture he had brought upon us all. He gave us no more of his copy-book moralities, and as soon as tea had come to a premature end, he muttered something about something else he had to see to, and left the kitchen.

After Lucy was in bed, Mrs. Dove redescended to the kitchen, and joined Caleb, to await the return home of the other servants, and the always tardy break-up of my uncle's social *sederunt*. She, poor soul! had lost her appetite, but she laid on supper for the old man, and even took down his pipe and placed it by his side. Softened, perhaps, for once, by these unmerited attentions, the offending butler, now that we were no longer present to witness his humiliation, actually made up his mind to express something like contrition for the deed he had committed. After sundry uneasy contortions of limb and feature, the hard lines of his face assumed something of a deprecating turn. He drew his chair towards that of his *vis-à-vis*, and then, in a voice not unlike the scraze of its legs upon the brick floor, gave utterance, as if with infinite effort, to the undeniable assertion that "Forgiveness is gracious."

Dolly, with a sorrowful but most forgiving smile, shook her head; "Ah, Caleb!" said she, "you were in a pet, and I suppose couldn't help it; but sure as we are sitting here, something amiss will come over this old house before another Christmas. Well, you may look as if you didn't believe it; *but we shall see.*"

At the parsonage we were all in our different ways addicted to entomology; following therein the example of its master. My uncle possessed a cabinet of entomological specimens, with a case full of entomological books, finely illustrated—also, in the season, an insect menagerie, of which the collection and the feeding were chiefly mine. The care of the cabinet and the books, as coming within the province of librarian, fell to the share of Caleb, who having, in their camphoring and dusting, made himself acquainted, by halves, with a few scientific names

of orders, families, and species, believed himself, from the acquisition of these scanty chips, to have become a deacon in entomologic craft.

On the morrow after the disaster of the cricket, my cousin and I were again the guests of Mrs. Dove, but then in her own, the housekeeper's room, for my uncle spent the day in bed, a custom of no rare occurrence on that which followed his annual academic commemoration. The next morning, however, being that of Christmas-day, we breakfasted, as usual, in the parlour; and received, each of us, a hearty kiss, and a blessing as hearty, appropriate to the season. In the same overflowing spirit he failed not to garnish both our plates with nicely apportioned slices of the spiced beef which always, at the festive season, reigned paramount over the ham and tongue of ordinary breakfasts. After having himself done ample justice to the ruddy round, he had just equalized its surface by a last shaving, Lucy, lately promoted to the office of tea-maker, was pouring out his third cup, when Caleb entered, and laid two letters on the table by his master. Of the two just arrived, one was a Christmas annual from my father, the vicar's brother, a merchant in London, the other a stiff, business-looking letter with a large seal, which my uncle, after he had read aloud the contents of the first, proceeded to open. Though fifty years have passed since that morning, I seem to have now before me the countenance of its reader under the talismanic change wrought by that piece of paper. He seemed to gulp down a rising exclamation, but it was more than he could do to swallow with it the remainder of his breakfast. Presently he put the letter in his pocket, rose, and left the room, bidding Lucy prepare for church, but in a tone as altered as his looks.

It was some time before the nature of that Christmas intelligence by which the vicar was so sensibly affected became apparent. For awhile there was no change within his household, save in his own dull depressed demeanour, with a shade of sympathetic gloom discernible in the face of Mrs. Dove.

Then, as from a tree shaken by autumnal blasts, every redundancy was seen to fall from the comfortable establishment of the parsonage cottage. House and kitchen-maids; stable-lad, and gardener, were one by one dismissed; the cows were driven to a fair; the pony became the property of a neighbour farmer. . . . The supplies of old pensioners dwindled till they died. The kitchen range became of course proportionately contracted, the jack was rarely heard; and as for the cricket, *that* was never heard or seen at all—never since that fatal evening;—he was departed—dead, or, if of mould immortal, mortally offended.

In a language of signs too significant to be mistaken was thus revealed the purport of that chilly greeting which had met my uncle upon Christmas morning; the announcement, for it was none other, of his banker's total failure, involving the loss of his whole fortune, except the slender income derived from his very small, poor, and lowly-tithed parish.

It may seem strange, but the boding impression made on Mrs. Dove by the wrong done to the favourite of her hearth did not appear so greatly deepened as might have been expected by the blow fallen already on her master's fortune. She was doubtless perfectly convinced that it had happened in accordance with her prophetic augury; but perhaps she had expected worse, and was relieved, therefore, at supposing the doom accomplished, and that ill luck or the offended cricket had done its worst.

Then there was another cause why Dolly's spirits bore up so bravely. She was more busy than ever. Prodigious were her efforts to supply to her impoverished master the deficiencies which, but for them, he might have felt in his personal comforts. His dinners were dressed with double care, more profusely garnished, more punctually served. Not a stew-pan did she suffer to grow dull in absence of the kitchen-maid, nor a parlour to mourn in dust and cobwebs for the absence of the housemaid. She supplied the place of all; yet every evening

would see her in her cap and apron of unsullied whiteness, the same respectable *concierge* as in better days, ready by her trim exterior and cheerful aspect to baffle the speculations of all curious visitors, whether to kitchen or parlour, who might come to pry into their minister's altered fortunes.

Though my poor uncle's affairs wore an irretrievable aspect, he had been urgently advised to pay a business visit to the metropolis by friends there resident. Amongst them was my father (his younger brother), who had sunk in mercantile adventure a younger brother's fortune, and was now, with the burden of a large motherless family, only toiling to acquire another. To his abode in the City my uncle had for above three months been promising to repair; but in a procrastinating spirit, half-nervous, half-supine, he had from day to day deferred his journey till the arrival of the second week in May, when he actually made up his mind to leave his home for the first time for many years.

The morning came on which he was to take the coach from the neighbouring post-town. Its distance of three miles was beyond that of his usual walking, and he was glad, therefore, to accept for the occasion a loan of the pony once his own. Caleb was despatched beforehand to bring it back, and carry his master's portmanteau, with a basket of provision for the journey, provided by Mistress Dove. About eight o'clock the traveller himself started. Dolly stood on the steps, looking after him with wistful gaze; Lucy and I (for a part of the way) bearing him company,—she seated on the saddle before him, I walking by the side. The labourers returning from their work to breakfast looked inquisitive as they touched their hats, wondering at the object of their pastor's early sortie.

Few were the words, but they were very kind, which my uncle said to us, and fond were the looks—fond and very sad—with which he regarded us as we proceeded slowly along the beautiful winding road, which, after passing the church, ran nearly parallel with the coast to the little sea-side town from

whence the stage started. Fond, as I have said, more earnestly fond than usual, were all his looks and words ; but of all, none were by me so well remembered as his parting injunction—"Take care, Frank, of your little cousin." This was given at the foot of a hill between us and the town, up which he had forbidden our ascent, and just as I was helping Lucy from the saddle after he had given her his parting kiss. Then he kissed me too. "God bless you, my boy! God bless you, my dear children!" and the pony, from habit, broke into a canter, and was presently half-way up the hill.

I felt, at that moment an unaccountable chill strike to my young heart ; but I was to "take care of my little cousin ;" and, seeing the tears streaming down her cheeks, I began the fulfilment of my charge, by trying to play the man, and do my best to console and to divert her.

Week after week passed over, and brought from my uncle only an occasional short letter, of which those received latterly made no mention of return. Meantime, the purse which he had consigned to Dolly on departure waxed low and lower, while, in like proportion, the face of the faithful stewardess grew more and more anxious, till she was an entirely altered person, in all but devoted affection, testified, if possible, more than ever towards us, her children.

One night, late in September, when we were assembled—Lucy on a low stool, one hand on Dolly's knee, the other on the head of the large white cat—her eyes, as those of us all, bent upon the fire, she suddenly whispered, "Look there! there's the cricket!" and she pointed as she spoke towards the hole into which our old favourite had run for refuge on being routed by Caleb from his original retreat. "Look there!" she repeated ; "I see his horns"—and sure enough, by the flicker of the dull fire-light there appeared protruding from the cranny a long pair of waving antennæ. Dolly, eager to be assured that it was the cricket's self, caught a candle from the mantel-shelf, lighted, and held it under the grate opposite the

cavity. Its occupant was not dislodged, because probably it was afraid to advance, and had no retreating passage in its rear; so motionless it sat, staring at the light or its examiner, who screamed with at least equal terror on discovery of what it was. It was no cricket after all, but a dark brother of the same order—one of those broad flat-bodied, night-loving, all-devouring, all-polluting, ill-scented creatures, the objects, as we have seen, of Mrs. Dove's especial hate and horror.

"It's only a cockroach," said I. "Only! dear," returned Dolly. "You may call it a cockroast; but I knows it well; 'tis a black beadle—one of the very same I saw when I was a girl at Mortiplume's, and never since. There they came by hundreds, and that was bad enough; but here, in this poor old house, it has *come by one*, and that's worse, for it's sure for certain to be the forerunner of a death, here, in the family, or not far off." "Nonsense, Dolly," said I; "it's not come to foretell death, but to pick up its own living,—the crumbs, perhaps, at our tea-time; for it's as fond, every bit, of bread and butter as your own cricket; but I'll read to you after tea all about it, and show you it's picture, or Lucy shall, in one of Uncle's books. I'll go and fetch it before it's quite dark."—"Not to the libery!—not to-night!" cried Dolly; and she grasped me tightly by the arm. I wanted to go, but did not like opposing the good creature, whose fears of the haunted room were then, we knew, in the ascendant.

While I hesitated, who should come to my relief but Caleb, who, bearing, perhaps, in mind his awkward part once in the drama of the cricket, had in this taken hitherto no part at all. "I'll go," said he. "I can inform you, Mrs. Dove, that Master Francis is perfectly correct; that hanimal is a cockroach—order *Coloptery*, genius *Blatty*—I'll get the volume—'seeing is believing'"—and he rose to put his purpose in execution. "But won't it do in the morning?" said Dolly. "You'd better take the candle, at any rate."—"Candle!" returned Mr. Caligraph, in his progress towards the door;

"moon's up—full this morning—nine o'clock, A. M., twenty minutes—and, supposing it was dark, I can put my hand on e'er a one of the books in the bookcase. I should think so—a man in my capacity—Order is admirable."—"Well, if go you will, go you must; but I wouldn't to-night," repeated Dolly, entreatingly, as Caleb opened the kitchen door, and shut it resolutely behind him.

Perhaps, however, when it was closed, a restraining something, sprung of Dolly's deprecating words or looks, or of his own fireside musings, made Caleb linger on the threshold, for a minute at least elapsed before we heard his creaking step across the hall, up the stairs, and then along the dark narrow passage which led into my uncle's study, the door of which we then heard close after him. "He might have left it open, at any rate," said Mrs. Dove, with a look of fluttering wonderment. Then all were silent, and, in momentary expectation of Mr. Caligraph's return, minutes went on till they made up perhaps a quarter of an hour—but no Caleb re-appeared. What on earth could he be about? I would have gone to see, but an imploring look from Dolly kept me back, till, thump! came the sound as of a heavy fall in the direction of the library. We all three started to our feet, and Dolly was the first to reach the kitchen door; there, however, she hung back, and, holding Lucy back by the hand too, followed me, bearing the candle, up the stairs.

The back-room door was shut, and something within obstructed its opening. Open it we however did, wide enough to gain admittance, and then, on the floor behind, found extended the prostrate length of Caleb. Dolly's fears took at the sight a new turn; she held the candle with a trembling hand over the features of her old fellow-servant, fixed now in even more than usual rigidity; but when by their scrutiny she had ascertained that nothing serious, in the way at least of bodily disorder, had overtaken him, she drew from that travelling dispensary, her ample pocket, some pungent restorer of

the wandering senses, and plied it assiduously till Caleb opened his ink-blot eyes, and, with recollection still at fault, recovered slowly sufficient of corporeal energy to rise from his recumbency, and totter, supported by the arm of Mrs. Dove, to his dormitory and his bed. There we must leave him, and, taking a few steps backward, relate his experiences of that memorable evening, as in substance or in shadow they were imparted next morning in the weakness of recent terror to the eager but anticipative ear of Mrs. Dove.

He had, as he declared, just entered the library, when the door, as if taken by a draught—though wind there was none—shut to behind him. The moon was shining brightly through the casement opposite, and threw a long black shadow on the floor from the high antique arm-chair, placed then with its back towards him, and fronting the library table, which stood not far from the cold empty fireplace. Caleb proceeded towards the bookcase, that division of it a little to the right of the chair, and just above it, which he knew so accurately to be the precise place of the desired volume. He stood under it—his arm was raised towards it; but another arm was stretched forth at the same time, and another hand, pale and shadowy, took down the book before he could lay hold of it. The apparition to which that hand belonged must have risen from the great arm-chair, whose back had screened it on his entrance; and before Caleb had time, if he had dared, to look upon its features, was again reseated, back towards him, book open, at an illustrated page, whereon it was pointing with its thin white finger to the figure of a cockroach. Caleb had seen enough, and attempted, his few teeth chattering, and his knobby knees knocking, to effect his exit from the library; had almost reached the door, when a cold arresting hand seemed laid upon his shoulder, and he fell, as we had found him, prostrate on the floor.

“Master is dead,” said Dolly, after hearing the above relation. “Master is dead; I know it;”—and her superstitious awe giving way presently to heart-breaking sorrow, she burst into an agony of tears.

If news of death were really on the road to us, as our Dove was now thoroughly persuaded, they travelled, like a hearse, slowly. Tidings none at all reached us of my uncle; but howsoever it might fare with him, his house seemed more than ever stricken with death-like symptoms of decay.

In the garden the ordinary touches of autumn were invested, to me, with more gloomy hues than they had ever worn before. Frosts had been sharp and early, and the dahlias, as they hung black and drooping over the middle walk, seemed to mourn for the admiring master, who, in his own pride, had so often propped them up in theirs.

But amidst these deepening tokens of decay, within doors and without, one was, to me at least, more perceptible, more heart-saddening than them all. Lucy, my little cousin, of whom I was to take care—she, too, in her early spring-time, was overtaken by autumnal blight. The cough—the hectic flush—the sparkling eye—the childish beauty, wearing now almost unearthly bloom, now a faded pallor, which bespoke too plainly its true character,—all these told me, though hardly would I believe their tale, that I should not long have my little cousin to take care of.

One cheerless rainy afternoon in November we were all as usual in the kitchen; Dolly seated by the dull fire, darning stockings; Caleb, opposite, reading a religious tract; I and Lucy standing by the window watching the heavy rain-drops and the light brown feathery leaves falling in a mingled shower from a deciduous cypress, which stood on the grass-plot opposite. Presently, there came a ring at the garden-gate—a ring low and half-fearful, as if the bell were pulled by a timid or unwilling hand. Keeper barked loudly; but it seemed to me as if there was more of recognition than of anger in his voice. We just saw the top of a hat—a gentleman's hat—above the close high gate. "It's papa!" cried Lucy—"it must be papa!" Dolly's stocking fell from her hand; but she sat still—she couldn't, or she didn't dare to move. I said nothing; but

my heart beat violently when, after a short parley at the gate, I saw who it was that entered and approached the house. It was my father, and he had come to bring news of my uncle—news that he was dead. His visit to London had been fruitless, excepting only of harass and fatigue. His banker's failure was complete, and he had been disappointed also of a small living, but of greater value than his own, which had lately fallen vacant, and of which the patron had given him a promise years ago when he did not want it. He was on his way homewards by the coach, when, as he was dismounting at an inn, where the stage stopped, he fell in a fit of apoplexy at the door. He survived only a few speechless hours; but from papers found about him the people of the inn were enabled to write to his brother, who arrived in time to find him just expired. He had left no will—had, indeed, excepting debts, little to bequeath. His remains were laid within the shadow of his own church, beside those of Lucy's mother; after which my father staid at the parsonage but a few days, employed, as days after death usually are, in the cold curious business of prying into papers and personal effects of the departed, and in forming such new arrangements as death may make requisite for those left behind.

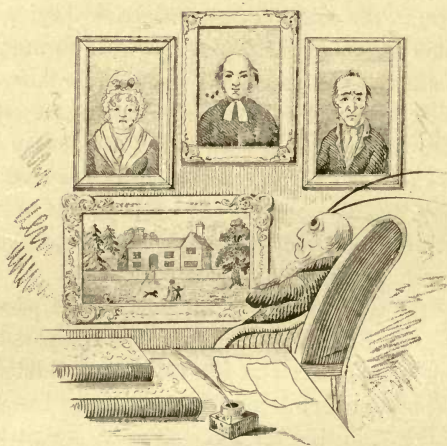
My father returned to business, leaving me and Caleb to follow after the latter had seen to the completion of some arrangements for the sale (for the benefit of his creditors) of my poor uncle's furniture and effects. His cabinet of insects and a few of the least costly of his books on entomology my father, at my request, contrived to save for me.

During the week or two which Lucy and I passed together before the day of parting I noticed few comparatively of her threatening symptoms; and she looked all childish bloom as well as beauty on that December morning. I saw her again on the Easter following the December that we parted, my first holiday from business, when my father allowed me to pay a few days' visit to Dolly's cottage.

Did I return with renovated hopes or fears confirmed? per-

haps with hope, for I applied myself to work more steadily than ever.

On the same anniversary—the cheerful spring-time of the following year—on a Saturday, when the church was open;—two persons were seen loitering in it. They were an aged woman of comely figure and mild though then overclouded aspect, and a youth of about seventeen, and they repaired presently from the aisle to the chancel, where they stood together, hand-in-hand, before a simple tablet let into the wall. The names of three individuals had been graven successively upon the marble,—that of a mother, who had died young—a father (late vicar of the parish)—and a child, their only child Lucy, who had followed them at the age of fourteen.



*Memory—Painter of the Past,
let us invoke thee!*

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